Engin.
brary

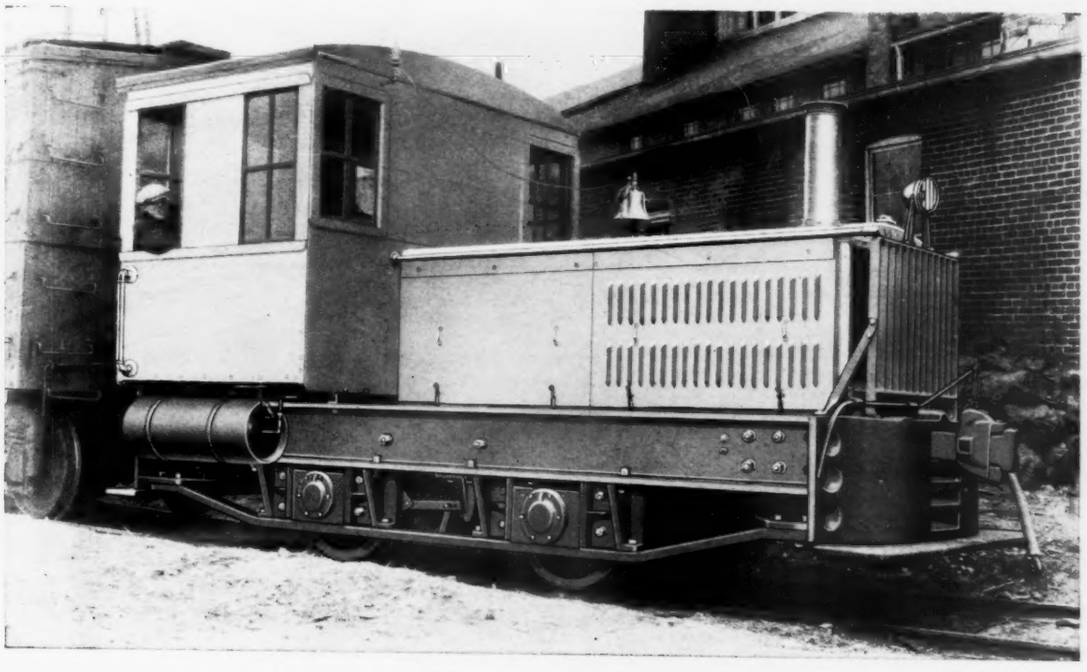
FEB 9 1925

Rock Products

With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Chicago, February 7, 1925 (Issued Every Other Week) Volume XXVIII, No. 3

It's Here! The PLYMOUTH 18-Ton Gasoline Locomotive



The PLYMOUTH 18-ton Gasoline Locomotive is the crowning achievement in gasoline locomotive construction.

Big 18 ft. 10 in. long, and 11 ft. high. Standard gauge 9 ft. 6 in. wide, with big, wide roomy cab so operator can see alongside of box cars. A wheel-base of 72 inches. Rolled steel wheels 33 inches in diameter.

Strong Steel girder-beam frame and bar sides with cast steel bumpers. Built for hard knocks.

Powerful 6-cylinder Trustworthy Climax Engine, and Plymouth 4-speed double reduction transmission, resulting in an enormous draw-bar-pull.

Flexible Four speeds, 2⅔, 6, 12, and 24 miles per hour, either forward or reverse.

Safe Westinghouse Automatic and Straight Air Brakes (optional). Hand brakes to all four wheels.

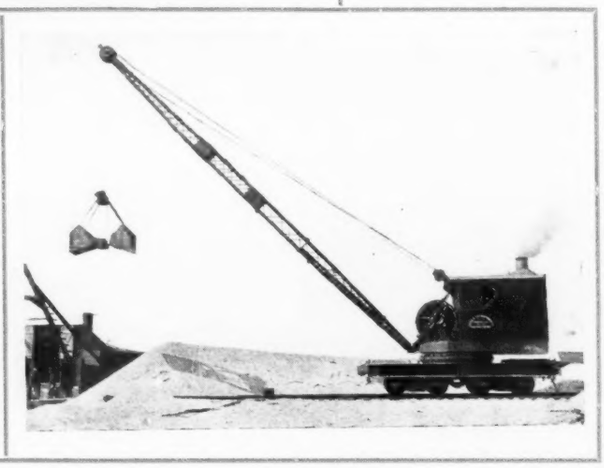
Economical Always ready, no licensed engineer, no "stand-by" expense, no boiler troubles, low operating and maintenance cost.

We have told but half the story. Write today for detailed specifications of this remarkable money-making locomotive.

The Fate-Root-Heath Co. *(Plymouth Locomotive Works)* **Plymouth, Ohio**

MEMBER A.B.C. *The Only Paid Circulation in this Industry* MEMBER A.B.P.

Next Issue Will Be February 21



Steady plugging on the job is the one thing that brings production up to the high water mark.

The O. S. Dependable crane is the one piece of equipment you can depend on to deliver a steady service performance day after day without any fuss or fireworks. It will plug steadily away, having sufficient reserve of strength and power to meet emergencies.

The O. S. is built to welcome continuous operation without fear of breakdown, fast depreciation or shortened service life.

Write for our catalog

ORTON & STEINBRENNER CO

CRANES ♣ BUCKETS ♣ SHOVELS

608 South Dearborn Street **Chicago, Ill.** **Factory: Huntington, Ind.**

When writing advertisers, please mention ROCK PRODUCTS

Rock Products
With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Vol. XXVIII Chicago, February 7, 1925 Number 3

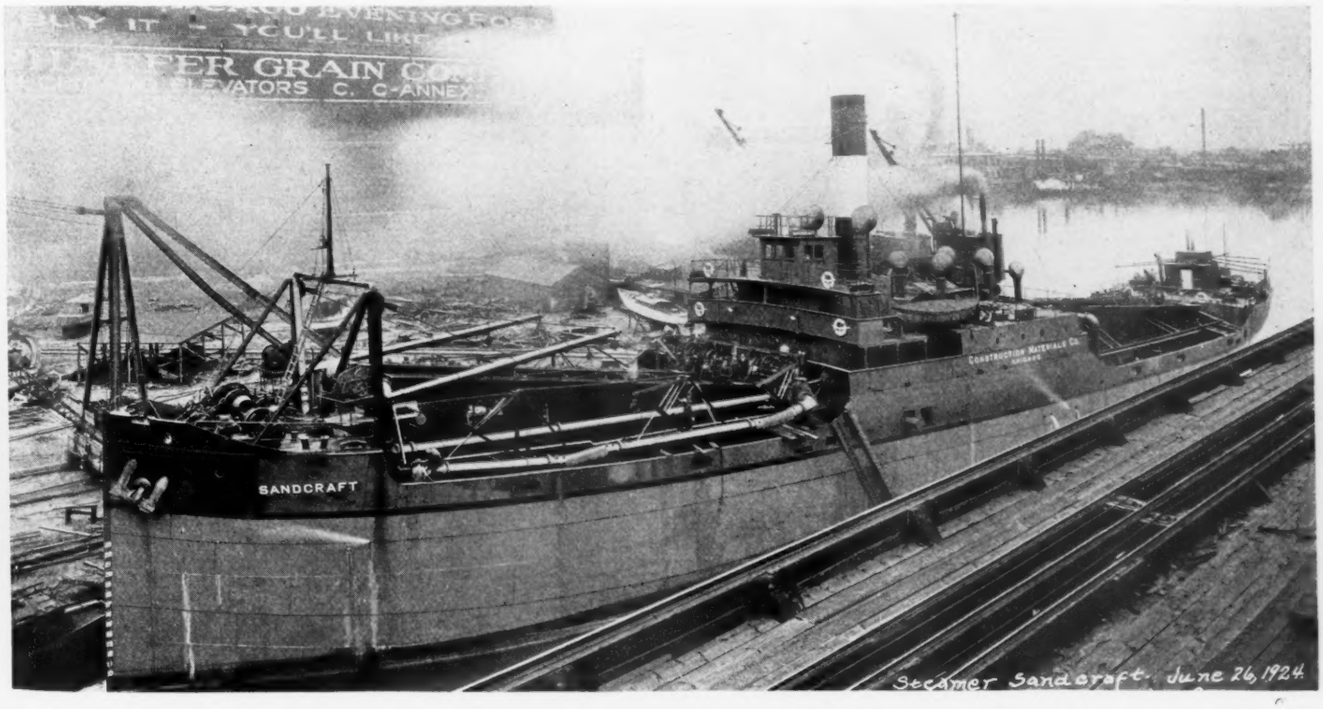
"Sandcraft," the Largest of Sand Dredges

Two 20-Inch Pumps Draw Plaster Sand and Asphalt Filler from the Bottom of Lake Michigan and Also Pump It from the Boat's Hoppers to Stockpiles and to Fill in on Lake Shore

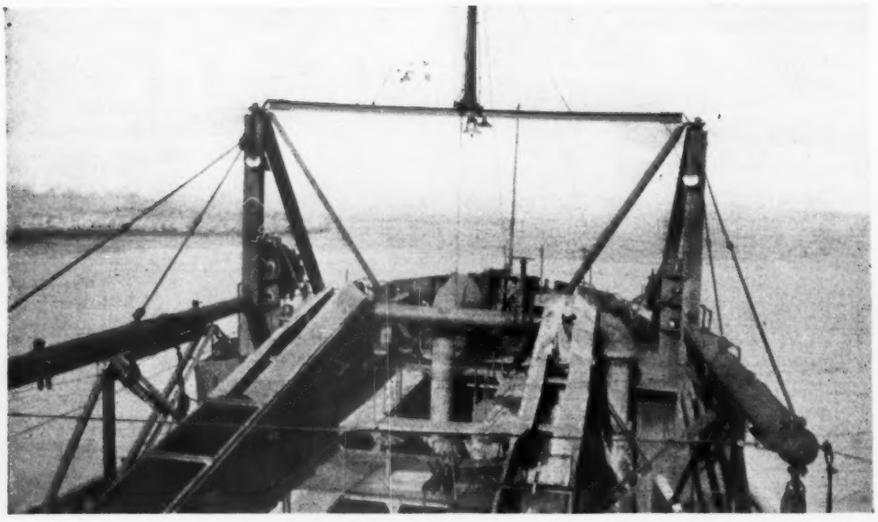
PRODUCING units in the sand and gravel industry grow larger each year. When 16-in. pump dredges were introduced a few years ago it was thought that the limit had been reached. But now comes the *Sandcraft* of the Construction Materials Co. of Chicago, a sea-going vessel with two 20-in. dredging pumps of special design, not only able to dig her cargo but also to transport it, and to unload the cargo with the same pumps that excavated it.

Of course sea-going hopper dredges are no new thing in river and harbor work, but even among these the *Sandcraft* stands out for her size, her excellent construction and design and her adaptability to the various classes of work in which she is employed. By way of emphasizing this one may cite the dimensions and capacity of an ordinary sea-going hopper dredge described in a standard book on excavation. This craft had a length over all of 155 ft. as against the 263 ft. of the *Sandcraft*, and her hoppers would hold 490 yd. as compared with 2000 yd. which the *Sandcraft* holds.

As a sand producer, the job of the *Sandcraft* is to dredge sand for many purposes, including plastering sand and asphalt filler off the Michigan shore. This sand is then discharged to stockpiles in the big yards which the Construction Materials Co. maintains at South Chicago. A surprising amount of such sand is sold in the Chicago market, far more than one would believe who thinks of sand only in connection with making concrete. But even this large amount cannot keep the *Sandcraft* busy throughout the season, so the remainder of the time is used in dredging sand for filling in the large improvements being made along the lake shore at Chicago. This filling material is good, clean sand, for the mud and silt found along-

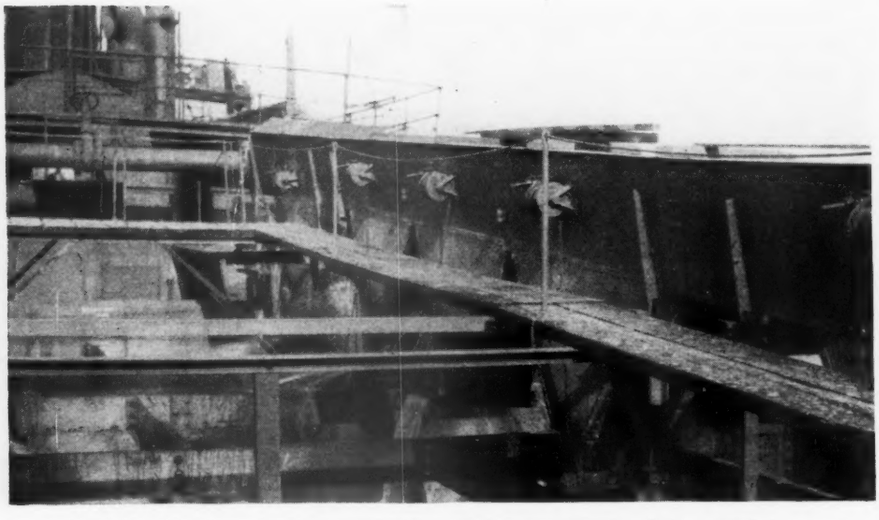


The "Sandcraft" as she appeared at the dock shortly before being put into service



Looking forward. The two suctions lie along the sides, as shown, when the boat is moving. When ready to pump, the suctions are swung out from the side by the cranes shown at the right and left

Looking aft. Both this and the picture above show the sluices through which the hoppers are filled. Galley and dining hall are in the house at the stern



Looking into hopper at rear. At the right is one of the sluices with traps through which the hopper is filled

shore near the city will not stand well enough. So that while engaged in this filling work the *Sandcraft* is still employed in sand production.

A Big Boat

The length overall of the *Sandcraft* is 263 ft., its molded breadth is 43 ft. 6 in. and its molded depth 20 ft. It is given the highest Lloyd's rating (*A1). The main propelling engine is a triple compound with cylinders 20 in., 33 in. and 54 in in diameter. There are two smaller triple expansion engines (12 in., 19 in. and 28 in. cylinders with 15-in. stroke), each of which is connected to a centrifugal pump of special design. These are nominally rated as 20-in. pumps, but are used with an 18-in. pipe line in pumping to the shore. Beside these main power units there are eight American Hoist and Derrick Co.'s 7-in.x12-in. steam winches and an American Shipbuilding Co.'s 10-in. by 10-in. steam windlass. The boat is electrically lighted throughout, the lighting engine and generator being in duplicate, and a powerful headlight is included in the equipment.

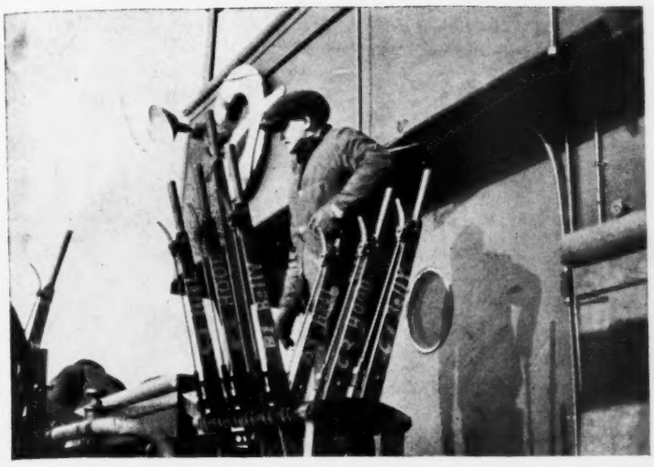
The greater part of the boat is taken up by the sand hoppers fore and aft which are 32 ft. wide and 23 ft. deep. In these the sand is pumped and when loaded they will hold 2100 cu. yd., although from 1600 to 1800 yd. is the ordinary load carried this year on account of low water conditions on the lakes. The hoppers are provided with overflows for the run-off of the excess water pumped in with the sand and also with suction outlets by which the sand can be pumped from the hoppers to the shore.

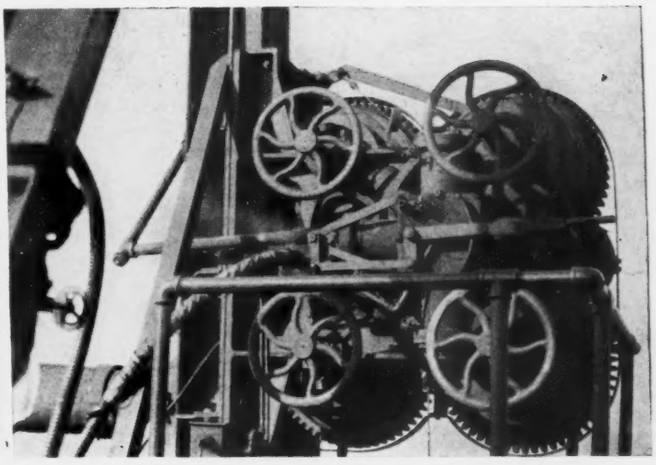
The suction pipes, 60 ft. long, are attached to the pump suction by flexible couplings and are each handled by three cranes. The lines for moving the cranes in and out and for raising and lowering the suctions go to steam winches. All the controls are brought to two sets of seven levers by which the pump men stand. Beside them is the instrument board from which they read the vacuum and pressure maintained by the pumps when these are working and by which they regulate the work of the pumps.

Making Clean Sand

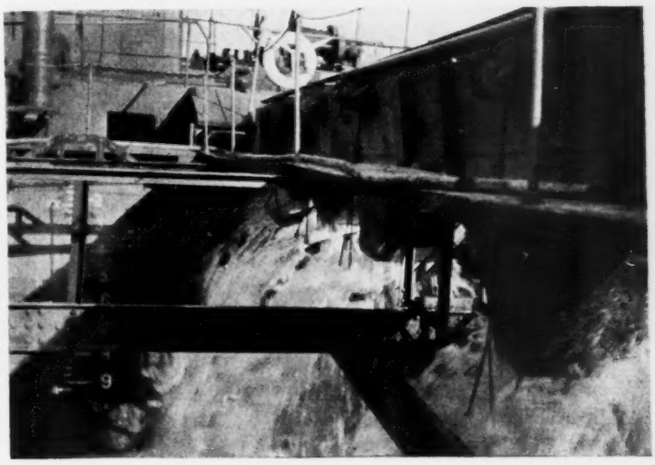
The pumps discharge into a pipe system which gives the greatest flexibility of working. Either pump can pump not only to either hopper but to either side of either hopper. It is sometimes necessary to confine the pumping to one side in order to trim the boat. The discharge from the pump to the hoppers runs into steel launders with screens in the bottom. A series of pockets in the bottom of these launders catch the sand in the stream, the excess water and mud flowing overboard.

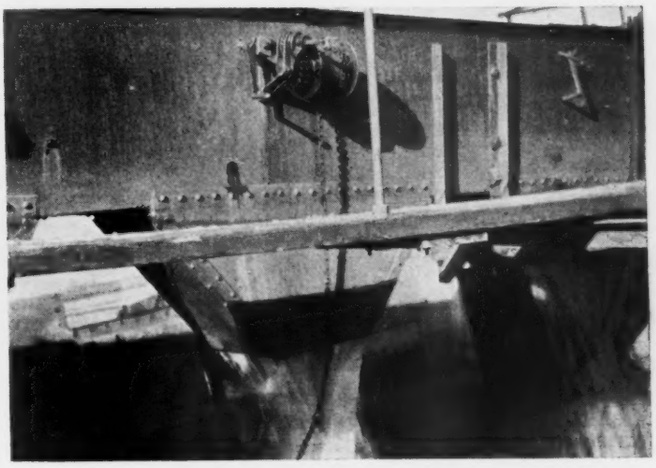
The design and operation of these launders is one of the features that differentiates the *Sandcraft* from the ordinary con-



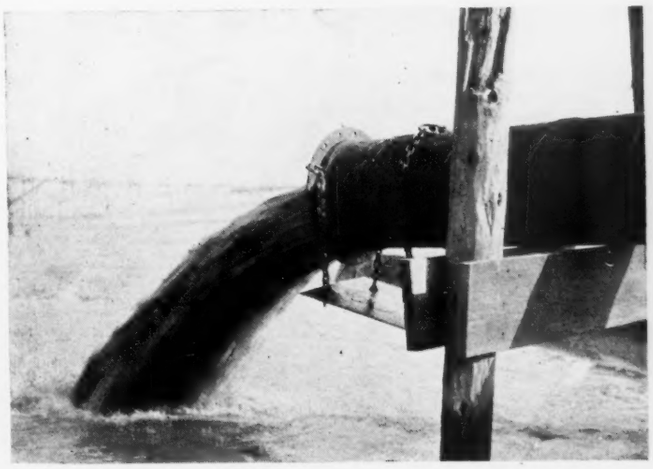


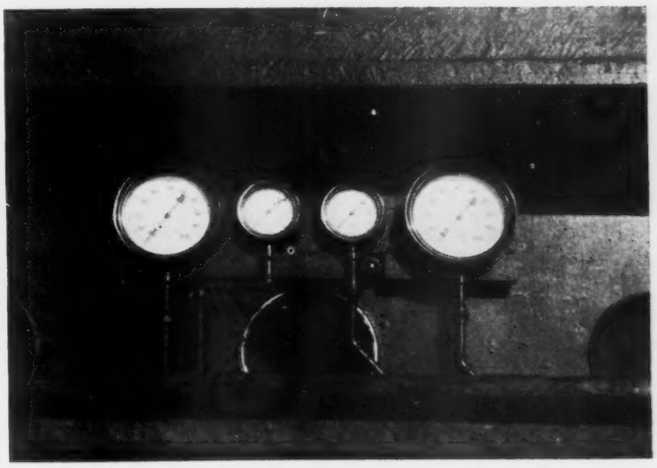
Left—There is a set of controls like this and an operator for each of the 20-in. pumps. Right—One of the small steam engines which move the suction cranes





Left—Sand and water pouring into the hopper from the sand traps in the sluice. Right—Close-up of sand trap showing gate and regulating chain

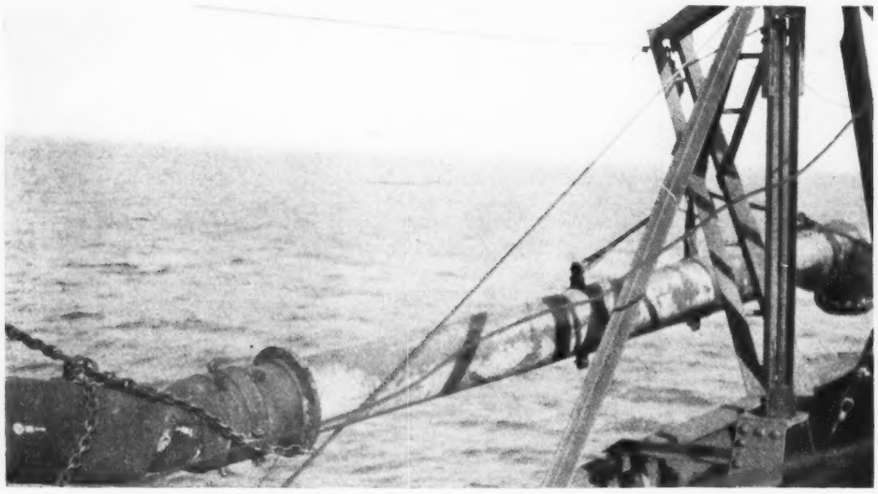




Left—Discharge from 20-in. pump to stockpile. Right—Instrument board with pressure and vacuum gages for both pumps

tractor's dredge. The screens of woven wire with ½-in. holes throw off all oversize and trash, insuring a clean product. The pockets are provided with gates, and may be so regulated as to classify the sand to a certain extent, and it is intended to carry this matter of classifying the product further at some future date.

On reaching the shore the discharge lines of the pumps are connected to shore lines through which the sand from the hoppers is pumped to stockpiles or to the space that is to be filled in. The Construction Materials Co. uses the Sensibar method, patented—an ingenious method of building stockpiles by pumping. Strips of canvas are used to cover a low dam of sand that confines the water and settling sand, the canvas preventing the dam from washing out. The excess water goes out through an adjustable overflow.



Part of 60-ft. suction and the crane by which it is swung out from the side of the boat

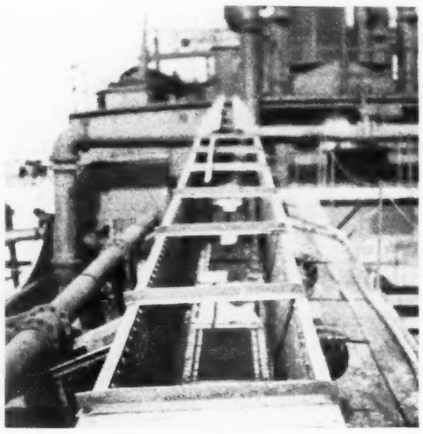
Outlet for the waste water on stockpile

Filling the hoppers from the sand bank in the lake requires from two to four hours, according to whether the "digging" is easy or hard. It takes about two hours to discharge the hoppers through the shore line.

The "Sandcraft" Runs Night and Day in Good Weather

With a big boat like the *Sandcraft* and her crew of 27 men, lost time runs into money, so the boat runs night and day during the season, stopping only when very high winds interfere with pumping or when extreme cold weather makes working impossible. No sooner does the boat reach the dredging ground than soundings are made, to be sure there is a sufficiency of sand before it, and the suctions are lowered and pumping begins. As soon as the boat returns the cargo is pumped out and the boat returns for another load. Working in this way the amount that such a dredge can handle runs into very large tonnage figures.

Next to its unloading method the pumps of the *Sandcraft* are its most distinguishing feature. They were especially designed and built for it by the Construction Materials Co. with the able assistance of the Worthington Pump and Machinery Corp., the ideas for this new type of pump being furnished by J. R. Sensibar, president of the Construction Materials Co. They are not at all like the ordinary dredge pump. They are more like the high-efficiency centrifugal pumps used so much in municipal water supply stations, and their efficiency is far beyond that of the ordinary type of dredge pump.



Screens in sluices

John Messner is captain of the boat and Joseph Brownell is first mate. Wm. Dueno is chief engineer. Captain Messner has been on the lakes since boyhood and the chief has been in almost every country in the world to which steamers go.

The *Sandcraft* was built in South Chicago during the war, went to the ocean by way of the Welland canal and was brought back here last spring and turned from a cargo boat to her present shape. She is splendidly built, steel construction being used throughout. The designs for her reconstruction were made by Mr. Sensibar.

The Construction Materials Co. is one of the larger producers in the Chicago territory having yards at South Chicago, and Chicago, Waukegan and Gary. In addition to the *Sandcraft* it operates the steamer *Barth* on similar work and a large sand and gravel plant at Ferrysburg, Mich., from which the steamer *Hennepin*, also owned by the Materials Construction Co., brings the product to Chicago. Other bank operations are at Gary and Miller, Ind., and Muskegon, Mich.

J. R. Sensibar is president and general manager, and R. C. Yeoman is assistant general manager. The offices of the company are at 133 West Washington street, Chicago.

Capt. John Messener

Chief Engineer Wm. Dueno

First Mate Joseph Brownell

Requirements of Sand for Sand Blasting

By W. M. Weigel
Mineral Technologist, Department of the Interior, Bureau of Mines

SAND FOR special purposes usually requires different methods of preparation from those where the ordinary mixture of sizes as naturally occurring are suitable. One of the classes requiring the most uniformly sized grains is sand blast sand.

The use of the sand blast has increased rapidly during the past few years. It was formerly used almost entirely in the foundry to clean and remove inequalities from rough castings. This is still the most important application, but in addition it is now employed for the removal of paint from old surfaces, carving and engraving on stone and marble, glass cutting, cleaning or renovating the walls of stone and brick buildings that have become discolored, preparing the surface of metals for the electrolytic bath, putting the final finish to metal surfaces and has even been proposed as a means of channeling or cutting out stone in the quarry.

Grading of Blast Sand

Some producers, especially those in the central states, or when only one or two grades are produced, have trade names for the different sizes. In the eastern states, however, some attempt at standardization has been made and the grades or different sizes are numbered. Those commonly made are No. 1, No. 2, No. 3 and No. 4, No. 1 being the finest and No. 4 the largest. Some producers make a No. 0, but this is unusual, while some do not make No. 4, as their sand banks do not contain sufficient material of this size. In general, a No. 2, for example, of one producer is approximately equal in size to a No. 2 of another. Although the same sized screens may be used, differences in their method of operation, slope and whether wet or dry screening is used, as well as the characteristic shape of the sand grains, will make variations in the finished products.

The following table shows the limiting size of screen mesh of each grade as reported by two producers:

Size No.	A	B
1	— 20 + 30 mesh	— 20 + 40
2	— 10 + 20 mesh	— 16 + 20
3	— 8 + 10 mesh	— 10 + 16
4	— 3/16" + 8 mesh	Not made

Screen sizing is by no means perfect, even under the best conditions, and there is always some undersize and oversize present. Samples were collected at several plants and screen analyses made. Tyler standard testing sieves were used. The results are shown below.

NO. 0 SAND

Mesh	Producer B, Pct.	Producer D, Pct.
+ 20	0.00	0.30
— 20 + 28	2.75	30.60
— 28 + 35	18.10	56.50
— 35 + 48	28.66	11.80
— 48 + 65	29.41	0.50
— 65 + 100	15.72	0.30
— 100	5.36	.....

Producer D's No. 0 sand is prepared primarily for a filter sand and hence the fines have been largely removed.

NO. 1 SAND

Mesh	Prod. A, Pct.	Prod. B, Pct.	Prod. C, Pct.	Prod. D, Pct.	Prod. E, Pct.
+ 14	0.00	0.00	0.20	0.40	0.00
— 14 + 20	0.75	0.10	10.10	35.30	1.00
— 20 + 28	39.22	5.05	48.40	61.50	27.00
— 28 + 35	51.76	42.45	37.10	2.70	64.40
— 35 + 48	6.85	39.91	2.80	0.10	6.70
— 48 + 65	1.08	11.89	1.40	.....	0.70
— 65 + 100	0.34	0.60	.....	.....	0.20

Producer E markets this product under a trade name and not a number, but it is included here, as it more nearly compares with the No. 1 sand of the other producers.

NO. 2 SAND

Mesh	Prod. A, Pct.	Prod. B, Pct.	Prod. C, Pct.	Prod. D, Pct.
+ 10	0.00	0.00	0.12	0.00
+ 14	22.00	1.32	27.20	32.20
— 14 + 20	60.42	18.98	63.40	46.15
— 20 + 28	14.25	52.15	9.16	13.70
— 28 + 35	2.25	22.49	0.12	6.15
— 35 + 48	0.60	3.62	.....	1.50
— 48 + 65	0.20	0.86	.....	0.30
— 65	0.28	0.58	.....	.....

NO. 3 SAND

Mesh	Prod. A, Pct.	Prod. B, Pct.	Prod. C, Pct.	Prod. D, Pct.
+ 4	0.00	.....	.....	.....
— 4 + 6	0.37	0.00	0.00	0.00
— 6 + 8	15.76	1.52	23.20	1.55
— 8 + 10	62.85	13.01	67.00	51.60
— 10 + 14	20.00	34.23	9.65	31.10
— 14 + 20	0.90	42.50	0.15	15.45
— 20 + 28	0.10	8.09	.....	0.30
— 28 + 35	0.02	0.55	.....	.....

NO. 4 SAND

Mesh	Producer A, Pct.	Producer C, Pct.	Producer D, Pct.
— 3 + 4	4.55	1.40	2.70
— 4 + 6	38.50	82.90	73.90
— 6 + 8	43.09	15.10	23.20
— 8 + 10	12.85	0.60	0.20
— 10 + 14	0.98	.....	.....
— 14 + 20	0.03	.....	.....

Considerable variations may be noted in the products from the different plants. However, for most of them the following range in sizes applies roughly, disregarding small percentages of coarse and fine material:

Sand No. 1—Through 20 and retained on 48 mesh
Sand No. 2—Through 10 and retained on 28 mesh
Sand No. 3—Through 6 and retained on 14 mesh
Sand No. 4—Through 4 and retained on 8 mesh

Producers have, in general, their own line of customers who are familiar with the use of the particular grade of sand they are using, and normally the producers would, at first, not see any advantage in uniformity of practice. It is not the intent or purpose of this paper to recommend standard sizes, but at the same time it would seem advisable for the producers to get together and discuss this point. The following range of sizes is suggested:

Sand No. 1—Through 20 mesh, on 35 mesh
Sand No. 2—Through 10 mesh, on 28 mesh
Sand No. 3—Through 6 mesh, on 10 mesh
Sand No. 4—Through 4 mesh on 8 mesh

Screening is not perfect, so that small amounts of coarse and fine material must be permitted. A minimum of not over 2% failing to pass the coarser screen and not over 5% passing the finer screen should make a satisfactory product and not be difficult to produce in a commercial way.

Shape of Grains

Considerable difference of opinion exists as to the relative merits of sharp, angular grains and rounded grains. Advocates of sharp grain claim faster cutting and those of the rounded grain claim smoother work and longer life to the sand. That is, that it can be used over more often and makes less dust. Many consumers have used only one kind and are therefore not basing their opinions on fact. One consumer reported that they used a certain sand because it had sharp cutting angles and they preferred it to the round. An examination of the sand showed it to be a decidedly rounded grain material.

All quartz grains have about the same hardness, but there is considerable difference in the "toughness" or ability to resist crushing and shattering. No method of testing this property other than actual use has been developed. The results of plant tests would be interesting, but on account of the many variables entering into the work would be misleading unless carried out most carefully.

Application of Different Sizes

No. 0 is little used. No. 1 is used for light work and where a comparatively smooth finish is desired, as for finishing automobile castings, finishing brass, frosting glass and removing paint. A large manufacturer of pipe fittings, both brass and iron, uses No. 1 sand exclusively. No. 2 is used for similar work but of heavier character. A manufacturer of enameled bath tubs uses No. 2 sand only. Nos. 1 and 2 are the sizes mostly used. Nos. 3 and 4 are for the heaviest cast iron and steel work only, very little No. 4 being used.

Mining and Preparation

The main producing centers are New Jersey, Ohio and Illinois.

New Jersey produces both bank or lake and beach sand. Mining or recovery is by steam shovel if the bank is above water level, and will not hold water for a dredging pond. If a pond can be made, the mining is usually done by hydraulic dredging with centrifugal pumps placed on a floating dredge and discharging to the washing and screening plant through long pipe lines. In some localities, as on the ocean beach, recovery is by locomotive cranes equipped with clamshell buckets.

Washing of the sand is carried on in all cases. This may be only screen washing where the sand is particularly clean. Other

methods include the use of sand cones and helical screw washers of the Lewistown type.

In rare cases the final screening or sizing is done wet, in rotary screens or trommels. This practice is unusual, as it involves the separate drying of each size. The usual practice is to dry the entire product after washing, or that portion of it taken out by wet screening to be sized to the various grades of blast sand. If only one size is made, it is usually by wet screening.

Both stationary steam dryers and revolving mechanical dryers are employed. The larger sizes, Nos. 3 and 4, are usually taken out by revolving screens of woven wire cloth. The finer sizes are separated on shaking or vibrating screens. At one plant the products were screened twice to remove excessive over and under size and make a uniform product. At another plant sizes 1, 2 and 3 are separated on stationary sloping screens. A good product is made, considering uniformity, but the efficiency is low and plans are under way to displace the stationary screens with vibrating ones.

The Ohio and Illinois sands are obtained generally from more or less coherent sandstone. Those in Ohio usually require crushing. The Illinois deposits are less consolidated and while they require blasting to loosen up the beds, disintegrate and fall to pieces in water sufficiently so that the material can be handled by dredging pumps.

Necessity for Washing

All bank and beach sand contains silt or clay, which, adhering to the quartz grains, can only be removed by washing. Also, varying amounts of vegetable matter may be present, which would break up and pass through the screens with the finished sand. A small amount of clay adhering to the quartz grains does not, in itself, lower the usefulness of the sand. For proper use, however, the sand must be perfectly dry; otherwise, it tends to choke in the sand blast machines. The presence of clay or similar foreign matter, may cause the sand to absorb moisture, and in this way, cause trouble in its use. Also, the amount of dust made is increased, but this is a small objection as clay dust is much less injurious in all ways than silica dust.

Utilization of Waste Blast Sand

In nearly all cases, the sand is used over and over, until the grains are broken too fine to accomplish the desired result. The fan exhausting the air, sand and cutings from the sand blast room discharges to a collector of some form in which the dust is separated from the coarser material. If a coarse size is used originally, the finer sizes resulting from breaking of the grains may be separated by screening and used for suitable purposes. In many instances the dust is considered worthless and is thrown away. At foundries a use may often be found for this material, and the following suggestions have been made.*

"The United States Silica Co., Chicago, furnishes the following data on possible uses for waste sandblast dust:

1. As a foundry parting it is shaken from a bag exactly as ordinary parting is applied.

2. Mixed with dead core or gangway sand it forms excellent cores, especially for thin, difficult work.

3. It can be used as a core wash in place of ordinary silica dust.

4. Under certain conditions, it can be used as a foundry facing, but the foundryman's judgment must be exercised in applying it to various classes of work.

5. It can be mixed with clay for luting the covers of annealing pots.

6. It has been employed successfully as an interlining between the brick flooring and the metal bottom of annealing and other furnaces. A layer of dry dust 1½ in. thick imparts a cushioning effect to the brick floor which aids in preventing breakage under heavy loads. The sand also insulates the bottom of the furnace which lengthens its life.

The waste sand also could be used as a mixture for making concrete but as particles of iron and steel would lead to discoloration, it should not be used on work above ground. The sand also has been used for covering newly laid asphalt roads, with excellent results."—*Reports of Investigations, Department of the Interior, Bureau of Mines.*

*Abrasive Industry, October, 1923, p. 305.

Phoenix Portland Cement Company Expands

THE Phoenix Portland Cement Co. has completed plans for the immediate construction of an addition to the plant at Birmingham, Ala., which will increase the present capacity of 1,500,000 bbl. annually by 33⅓%. Contracts for the necessary machinery and equipment are being let and the work will be started immediately.

Lindley C. Morton, president of the company, states that the company has authorized an increase in its capital stock to $4,000,000, and is now prepared to proceed with its proposed new plant at New Orleans, Ala.—*Birmingham (Ala.) News.*

Projects for New Cement Plants in Catskill, N. Y.

CONSIDERABLE drilling for samples of lime rock is being done on properties in the southern part of Catskill, N. Y. This rock is believed to be well adapted to cement manufacture and investigations thus far confirm the belief.

There are already three cement plants in and around Catskill, and according to the present prospects at least two more plants may be built in the near future.—*Kingston (N. Y.) Leader.*

The Analysis of Phosphate Rock

AN article on the analysis of phosphate rock, by G. E. F. Lundell and J. I. Hoffman of the Bureau of Standards, was published in the journal of the Association of Official Agricultural Chemists, volume 8, pages 182-206.

Methods for the determination of moisture, phosporic acid, "soluble iron and alumina," and calcium are given, together with results obtained in the analysis of the Bureau of Standards standard sample of phosphate rock by the use of these and other methods.

The use of boric acid is desirable in preparing solutions for the analysis of phosphate rock, for this lessens the hydrofluoric acid attack on glassware and prevents the interference of this acid in determinations of phosphorus.

Results obtained by solution of the ammonium-phosphomolybdate precipitate and a single precipitation with magnesia mixture cannot be correct except through compensating errors, for the precipitate always contains molybdenum and is rarely of ideal composition. If magnesia is added too slowly to neutral or ammoniacal solutions of phosphate, the results are usually low. For accurate analyses, solution of the magnesium ammonium phosphate precipitate is recommended, followed by the addition of 2 to 3 cc. of magnesia mixture and reprecipitation by ammonia.

In the alkalimetric method for phosphorus, the solution should not be heated after the addition of the molybdate reagent. The 23:1 ratio cannot be used in calculating the phosphorous titre of the sodium hydroxide solution unless the method is carefully worked out and followed to the letter.

It is not difficult to get concordant results for "soluble iron." The determination of "soluble alumina," on the other hand, requires rigid attention to a definitely defined method of solution and careful analysis if comparable results are to be obtained.

Portland, Ore., Ends Sand and Gravel War

A SAND AND GRAVEL WAR has just been terminated in Portland, Ore. Rates on the dock were cut from $1.35 to 75 cents, with cartage rates cut from 50 cents a yard on the first zone and an increase of 10 cents for every half mile, to 25 cents a yard.

California Pumice

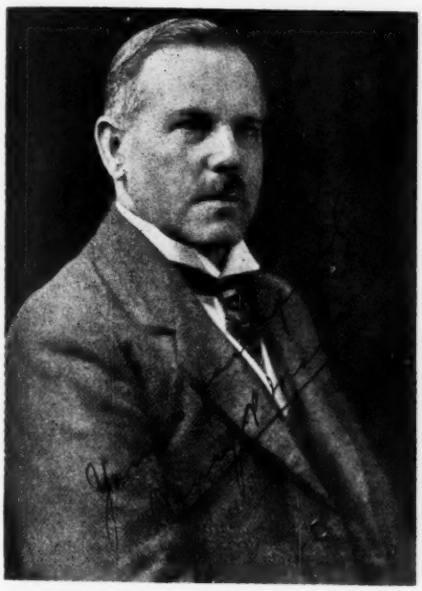
PUMICE ISLAND, near Salton sea, five miles northwest of Calipatra, in Southern California, contributes 30 carloads of pumice to the commerce of the world each year. Pumice Island was once an island in Salton sea, but now, three miles inland, it is entirely surrounded by dry land.

What the British Quarry Association Has Done for the Industry

How They Have Solved Many Technical Problems and Changed Jealousy to Fair Competition

By S. McPherson
General Secretary of the British Institution of Quarry Managers

THE esteemed and energetic Editor-Manager of ROCK PRODUCTS, Mr. Nathan C. Rockwood, has asked me to write an article for insertion in his journal and gives me as the "terms of reference" the following:



Sir Henry P. Maybury, president of the Institution of Quarry Managers

1. What has The Institution of Quarry Managers given to the Quarrying Industry of Great Britain?
2. British opinions of what a quarrymen's association should be.

Now those terms of reference are most difficult for me to deal with for various reasons, not the least being that my enthusiasm for our Institution of Quarry Managers and my pride in its progress and success is apt to make my pen run away with me when dealing with the first item, and my views of what the institution has given to the industry may be exaggerated. As to the second item, I cannot claim to be able to voice the views of the industry in general and am not bigoted enough to think that my personal views represent the general view. However, I can play for safety with this by outlining the aims and objects of the different quarrying associations in Great Britain as far as I know them.

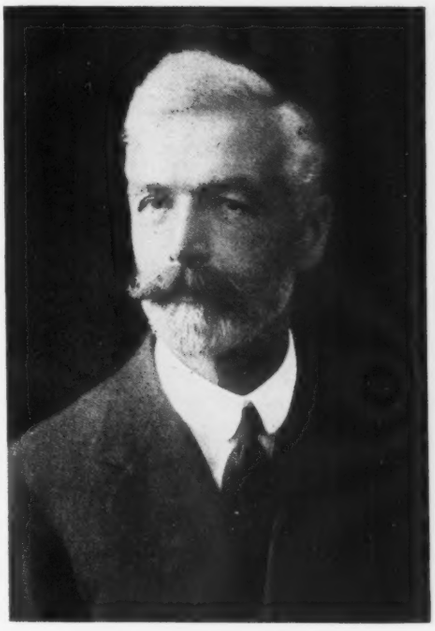
The Institution of Quarry Managers

It may not be out of place to briefly give the history, aims and objects of The Institution of Quarry Managers, although this Institution is not altogether unknown in any English speaking part of the globe. I believe we can claim to have been the first association of quarry managers in the world, your National Crushed Stone Association, not coming into operation for a year or so (if my memory serves me right) after we few pioneers had the temerity in 1917 to meet in an endeavor to form a chain which would link quarry managers—quarry manager with us implies quarry owner and what you in America name quarry superintendent—together for the purpose of friendly intercourse and the discussion of problems common to all. We started with a membership of a half dozen, not one of whom was endowed with any superfluous cash which could be given to further the cause, and under a great handicap in naming ourselves "The Quarry Managers Association". It may surprise our American friends to know that if we had from the commencement named ourselves an "Institution" and not an "Association" we would have been welcomed with open arms—perhaps. However, an association of quarry managers, in the eyes of a few big men in the quarrying industry, could only have one object, and that to improve financial positions of the members. In effect they said we must be a trades union.

Thanks to a few broad-minded stalwarts we overcame that and the half dozen of 1917 numbered 500 in December of 1924. The first year or two was a struggle, a financial struggle. All services and out-of-pocket expenses were met by the individual, the yearly subscriptions going to meet the expense of postage, printing and so forth. The objects of the Association in 1917 were stated as follows, and no material alteration has been made since or is likely to be made in the future.

"An Institution for the discussion of technical and geological questions relating to quarrying and other matters pertaining to the control of quarries and the welfare of members."

Well; what have we given to the industry? To answer this broadly I believe the Institution has been the means of giving to the quarrying industry of Great Britain an education they could not otherwise have had. It should not be forgotten that our membership is not confined to Great Britain; we have members in Egypt, India, South Africa, Canada, New Zealand, Australia, France, Spain, Norway, and a few in America. Mr. Smith who is one of the leading men in the National Slate



Henry J. Grace, vice-president

Association of America and Mr. Roberts of Granville, N. Y., were two of our first members abroad. We fondly hoped that we would have been able to have a branch in the United States of America, but your own Association have come along so quickly and been so ably managed that we suppose we must be content, although reluctant to leave America to the Americans. We have cut out the misguided jealousy of quarry managers which was simply the fruit of being absolute

strangers one to the other and opened the doors of all quarries for our members to go and see what others are doing, see what others have achieved, and then go back and do likewise. Rivalry, which was before often a personal feeling of jealousy and antipathy, has now become friendly trade competition. By the reading and publication of technical papers on every subject connected with the industry and by discussion through pages of our journal on various questions pertaining to the industry we get the experience of a number of practical men pooled for the benefit of them all. It should be understood that, unlike your National Crushed Stone Association or National Slate Association, our Institution embraces all classes of quarries—crushed stone, building stone, paving stone, granite, basalt, sandstone, limestone, in fact quarries of any and all kinds and qualities of stone, slate, etc.

E. P. Page, chairman

As a very small example of what we have given to the industry may be mentioned the discussion on modern oil engines which followed a paper read before one of our branches some months ago. The paper was published in our journal, and dealt in particular with the four-cycle cold starting horizontal crude oil engine, and was immediately followed by a lengthy well-written and interesting letter of criticism by a user and supporter of the two-cycle vertical crude oil engine. I forget at the moment the number of members who have taken part in the discussion of whether the four-cycle horizontal or the two-cycle vertical oil engine is the most satisfactory for quarry work, but what I do know and have proof of is that a very large number of quarry owners and managers know now a great deal more about modern oil engines than they did before, and I can safely say would ever have done if it had not been that our Institution and journal made this discussion possible.

Our Institution confines itself to the technical and practical side of the production of the quarries; the marketing and labor problems we leave severely alone. We have in this country a very strong organization which goes under the name of The Federation of Quarry Owners, and there is another named The Slate Quarry Owners Association which deal with the labor side of the business.

We believe we have gone a long way towards achieving one aim of our institution and that is to raise the status of the quarry manager, but we are not yet satisfied with our labors in this direction and will not be until quarry management is a recognized profession. Not so many years ago, or to be more definite, before the war (and in this country pre and post war are as two different worlds), quarries with a few exceptions were very small, badly equipped concerns, but since 1918 the introduction of improved machinery and improved methods of working has revolutionized the industry so that while 10 years ago it was thought that any Tom, Dick or Harry could manage a quarry, now only a man of experience can hope to work a quarry profitably. Perhaps it was just coincidence, or luck, but our institution came into being at the time this revolution in quarrying commenced, and by our dissemination of knowledge we can claim to have very greatly assisted quarry managers in their endeavor to equip their quarries to cope with the altered conditions. And we consider that in consequence of the experience, skill and engineering and other qualifications required now by the quarry manager his occupation should be classed among the professions. We have done something towards this and hope to do very much more in the near future.

P. J. Lycett, honorary treasurer

Our annual conferences which are on somewhat similar lines to your conventions in America give quarry managers from all over our comparatively tiny bit of island an opportunity to fraternize and swap ideas. Incidentally it may be mentioned that we were very disappointed that Mr. Rockwood found it impossible to carry out his promise to be with us at our last conference.

We have the British Isles divided into districts and occasional meetings are held during the year in the various districts. These meetings bring together the local managers and it can be said without exaggeration that before the institution was formed there were neighboring managers almost within a stone's throw of each other who were complete strangers. To give a concrete instance, I know managers living 30 miles apart who had never seen each other until our institution brought them together. And while, previously, they knew each other by name, they were most suspicious of each other, and were agreeably surprised when they did come together at a meeting of the institution to find what decent neighbors they had.

But if we have given the industry some little assistance, we do not claim to have

J. Edward Roberts, vice-chairman

given it a great deal or anything like what we should like to give it, but we are young yet and gaining experience as we jog along.

What a Quarrymen's Association Should Be

Before giving the British opinions as to what a quarrymen's association should be, let me give my personal opinion. Assuming that "quarryman" is intended to mean a quarry executive, and not a laborer, as is meant by the word "quarryman" in this country—*a quarrymen's association should be exactly what "The Institution of Quarry Managers" is and hopes to be,* and if we can have an amalgamation of your quarrymen's associations, the National Crushed Stone Association, the National Slate Association, and any others you have with the Institution of Quarry Managers, we will have "What a Quarrymen's Association SHOULD BE."

Such an amalgamation would bring together the finest brains of the quarrying industry of the world to deal in conference with the increasing problems of an ever-increasing industry and be financially strong enough to carry out what associations and institutions thus amalgamated should and hope to be.

Now I will try to give British opinions as requested by detailing to the best of my ability the aims and objects in my own words of the various British associations which I know.

Selfishly I commence with *The Institution of Quarry Managers,* and the opinion of its members is that an association of quarrymen should be a society of all quarry owners and quarry managers of every class of quarry in the world, banded together for the dissemination of knowledge amongst its members, free from all petty jealousies, fraternally amalgamated to "do unto others as you would have them do unto you." Alive to the necessity of free and fair trade competition, and every member to do his utmost to make his association what he would like it to be.

Our National Joint Industrial Council of the Quarrying Industry is an association of quarry owners and representatives of the Men's Trade Unions to deal with labor problems, conditions and hours of labor and wage questions, and has been very much concerned of late over the question of wages paid in municipally owned quarries, it being alleged that in many municipally owned quarries the rate of wages paid is lower than in privately owned quarries.

The Federation of Roadstone Quarry Owners is divided into districts and is composed of practically every quarry owner in Great Britain. Each district deals individually with conditions of labor and wages in its own district, while the Council of Federation deals with the matters put before it by the districts.

The North Wales Slate Quarry Owners Association, composed of the representatives of the principal slate quarries on the United Kingdom, deals with labor conditions and wages. There are others, all of which are formed to deal with labor questions.

From the above I believe that you will agree that British opinions of what a quarryman's association ought to be are not greatly different from the American opinion.

"Sentinel of Safety"

THE picture is that of a bronze trophy which will be awarded by *Explosives Engineer,* published by the Hercules Powder Co., to the mine or quarry that can show

Trophy to be awarded to mine or quarry with lowest accident record

the smallest loss of time for the volume of work done. The plan of presenting it has been worked out by the U. S. Bureau of Mines in connection with the National Safety Council, a number of state departments of mines, and other organizations. It will be awarded annually at the First Aid Meet conducted by the Bureau of Mines.

The contest the first year will be limited to 500 mines and quarries which notify the Bureau of Mines of their intention to compete and furnish the necessary reports which must cover the complete period of operations during the calendar year preceding the First Aid Meet. To make the award the Bureau must be supplied with all lost-time accidents. The rules place a double penalty on accidents with explosives. The trophy is appropriately called a "Sentinel of Safety."

An Omission

THE article "Testing Sand for Bulking," in the January 10 issue of ROCK PRODUCTS, should have been credited to the magazine *Public Roads.*

Utah-Idaho Cement Company Takes Over Ogden Cement Company

THE Utah-Idaho Cement Co., capitalized at $25,000, has filed articles of incorporation at Ogden, Utah, and will take over the plant and business of the Ogden Portland Cement Co.

The company, while incorporated for a nominal amount, will immediately increase its capital stock to $1,500,000, which has all been subscribed by the present stockholders of the Ogden Portland Cement Co., according to Chapin A. Day, president. This is an increase of $500,000 over the capitalization of the Ogden Portland Cement Co.

The Utah-Idaho Cement Co. has acquired a large cement rock deposit near Pocatello, and, while present market conditions do not justify a cement plant in Idaho, it is the intention of the company to build one when the demand for cement warrants so doing. The present plant of the company is at Baker, Utah, and has been in successful operation since 1909.

The officers of the new company are: Chapin A. Day, president; Harold C. Day, vice-president and general manager; Ralph E. Bristol, secretary and treasurer, who are incorporators also, and, with other incorporators, Mrs. Florence D. Bristol and Mrs. Ruth M. Day, will constitute the board of directors.—*News, Brigham City, Utah.*

According to Colorado papers the ideal Cement Co. has recently increased its capital to $37,500,000, of which $12,500,000 is preferred stock and the remainder common.

Charles A. Hall is president of the company.

Hermitage Portland Cement Company Declares Dividend

AT the annual meeting of the stockholders ers of the Hermitage Portland Cement Co., held at Nashville, Tenn., announcement was made that, to meet the increasing demand for the product, the plant will have to be operated full time, winter as well as summer. The storage capacity will also have to be enlarged.

An 8% dividend on the preferred stock was declared.

John C. Vance, president, reported that orders on hand approximate 40% of the annual output.

The election of officers and directors resulted as follows: John C. Vance, president; J. N. Stone and T. L. Herbert, Jr., vice-presidents; R. T. Miller, secretary-treasurer; directors, in addition to above, M. C. Monday, R. D. Herbert, Fred L. Conner, Rogers Caldwell, J. E. Rodes, W. N. Fry and Charles L. Hall.—*Nashville (Tenn.) Banner.*

One of the two dredges pumping to the relay plant. The derrick boat for stripping is at the extreme left

Making Blast Sand and Other Special Sands

The Menantico Sand and Gravel Company of Millville, N. J., Makes a Variety of Products, Including Aggregate, Filter Sands and Pebbles and Stucco Material

THE sand and gravel deposits of the southern half of New Jersey are highly silicious, enough so in fact to be worked for glass sand in some places. The grains and pebbles have been worn by water transportation to an almost spherical shape, and these two things give the material a particular value for particular purposes. The making of filter sands and gravel is one of these, but another and more important purpose is that of sand for sand blasting.

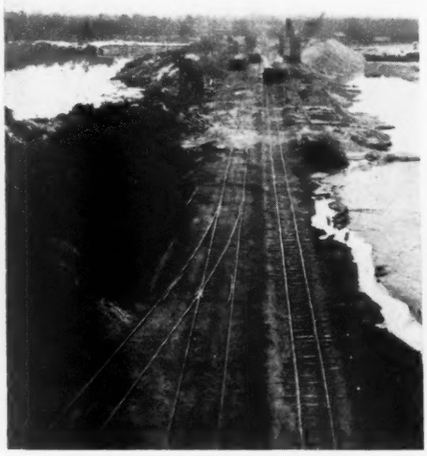
Sand blasting sand is better spherical than angular because it does not break up so much with the force of the blast. A pure silica sand is better than sands which contain much feldspar or iron oxide because it is harder and cuts faster.

Of course the same qualities make the sand and gravel an excellent aggregate and the main part of the production of this section is for aggregate purposes.

The Menantico Sand and Gravel Co. is one of the larger producers in this district. Its office is in Millville, 36 miles east of Philadelphia, and its plant is at Menantico, four miles out of Millville. There is nothing except the plant at this station.

The sand and gravel are excavated by two steam driven suction dredges. These and their predecessors have been at work for a number of years as the lake they have dug attests. It is almost a mile long and in some places nearly a half mile wide.

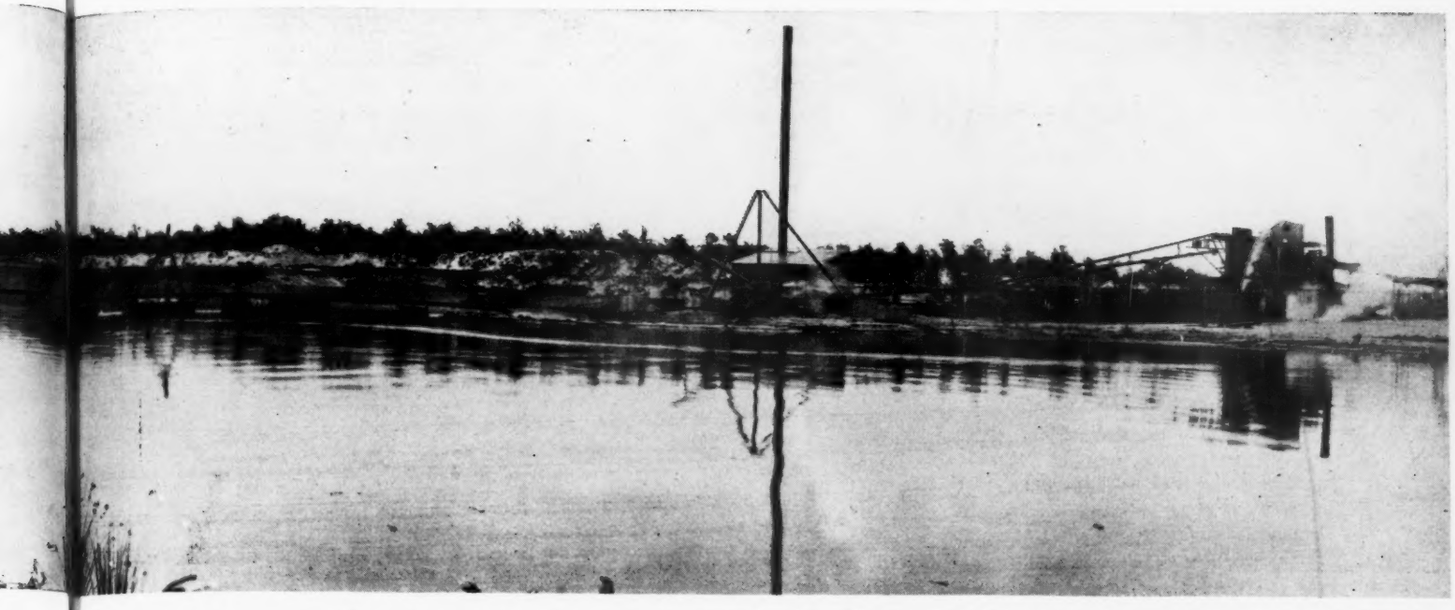
The pumps on both dredges are 12-in. Morris pumps, but one has been fitted with Taylor-Wharton manganese steel liners and the other with an American Manganese Steel Co.'s shell. Both are driven by Corliss (reciprocating) engines made by Hughes and Phillips. The pipe lines to the washing and screening plant on the shore are made up of both standard and light weight pipe, the latter of electric-welded sheet steel. The heavier standard pipe is used on that part of the line that is considered permanent, and is laid on cross timbers supported on piles. The lighter pipe is used in the short pontoon line that connects the dredge with the permanent line.



The unique haulage system employed. A locomotive on the narrow-gage track (left) tows standard-gage cars on both sides

One of the dredges is now so far from the washing and screening plant that it cannot pump directly and lift the sand and gravel to the required elevation. It therefore pumps to a part of the lake near the screening plant. The sand and gravel is picked up by another pump, a 12-in. Amsco, and relayed to the screens and sand boxes.

The deposit has from two to three feet of surface soil which must be stripped and the method of stripping is one of the simplest and most efficient that the writer has seen in connection with a dredging operation. The boat used for stripping has a stiffleg derrick with an 80-ft. boom. It is powered by a 3-drum, 9x14-in. Flory hoist and has a Meade-Morrison clamshell bucket of 1½-yd. capacity. This derrick



The relay pumping plant and the shore plant to which the sand is raised by the relay pump

Close-up of the relay pumping plant

boat goes close to the shore and strips off the surface soil and roots and side casts them as far as it can into the lake. The dredge follows behind working into the bank and its suction is always far enough away from the strippings so that there is no danger of the sand being contaminated by them. In fact very little clay or dirt is ever pumped by the dredge.

The shore plants to which the material is pumped are of simple design but excellently adapted to the purposes for which they are built. A considerable amount of the production of this plant goes for highway purposes and the specifications for highway material in New Jersey, and its inspection, are rather more rigid than in some other states. Consequently a number of sizes have to be made and the screening must be thorough. The work is done by a combination of gravity and revolving screens.

The discharge from the pump is spread out on a "fanning table" to a width of 20 feet. It falls over the edge of this table on to a gravity screen set at 45 deg. This screen is 20 ft. wide and 5 ft. long and is made up in removable sections for convenience in replacing screens. The striking of the oversize against the screen aids materially in keeping it from blinding.

This gravity screen is covered with ¼-in. mesh wire cloth and its undersize with the greater part of the water from the pump goes to plain sand settling boxes with hand operated valves. A swinging spout below these valves enables the workman to deliver the discharge to various parts of a car as it is loaded.

The gravel (oversize of the gravity screen) goes to two Reliance screens made

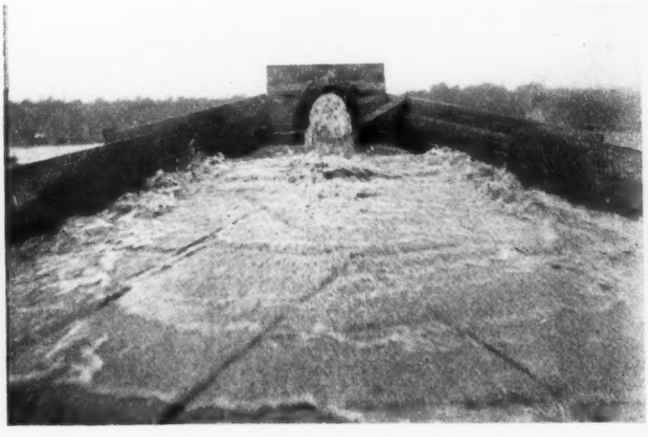
Gasoline locomotive on narrow-gage track towing cars on standard-gage track

by the Universal Road Mach. Co., Kingston, N. Y., for sizing. Very little water is used with these screens. The sizes made are "pea gravel," "¾-in.," "1¼-in." and "2½-in." gravel. The screens are 36 in. in diameter and 16 ft. long. The various sizes of gravel fall into pockets or run directly into cars.

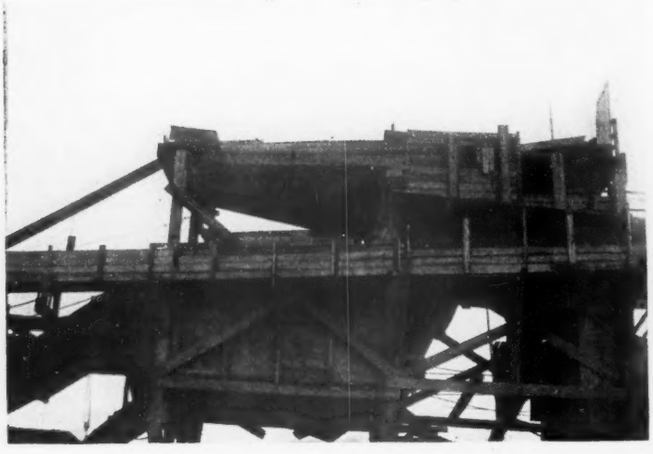
The two shore plants are alike in the screening system used but differ somewhat in layout and construction details.

As there is no bin capacity to speak of in these plants the greater part of the output has to be run directly to cars and this calls for a considerable amount of car shifting. An ingenious layout of the plant permits this to be done easily by a narrow gage Porter dinky and a Plymouth gasoline locomotive. A straight narrow gage track runs the full length of the operation paralleling the standard gage tracks on which cars have to be shifted under the spouts of the plants and also switched to the side tracks. A wire cable about 75 ft. in length is hooked on to the locomotive and the car that is ready to be moved, the length being such that the locomotive does not have to pull too much on one side, even when cars are switched to another track.

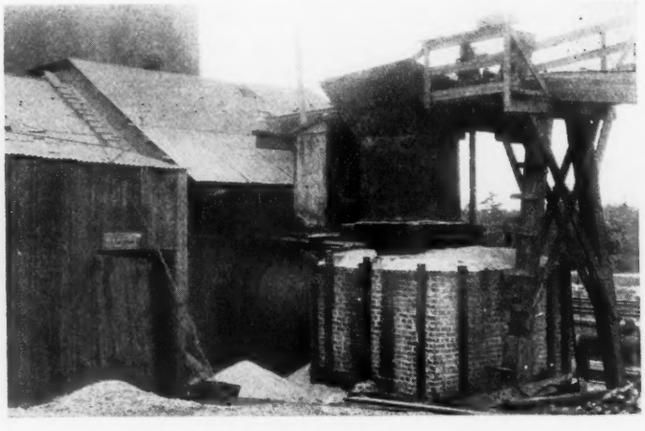
There are a number of advantages to this system, but one of the main ones is that the locomotive can always be



Left—One of the washing plants with apron above and screens below. Right—Pump discharge "fanned out" on apron



Left—Detail of plant above. Right—The shore plant served by relay pump from which gasoline locomotive is pulling out a filled car



Left—Stockpile for blast sand plant showing tunnel below the pile in which cars are loaded. Right—Hopper to dryer of sand blast plant into which cars are dumped

The blast and filter sand plant showing crane and stockpile, at left, incline to dryer hopper and screening plant

attached to a car even though other cars are in front of it or behind it. This saves a lot of time in pushing cars around

Gravity screening plant for rescreening gravel

so that the locomotive can get behind or in front, as would often need to be done if the locomotive was not working on a parallel track.

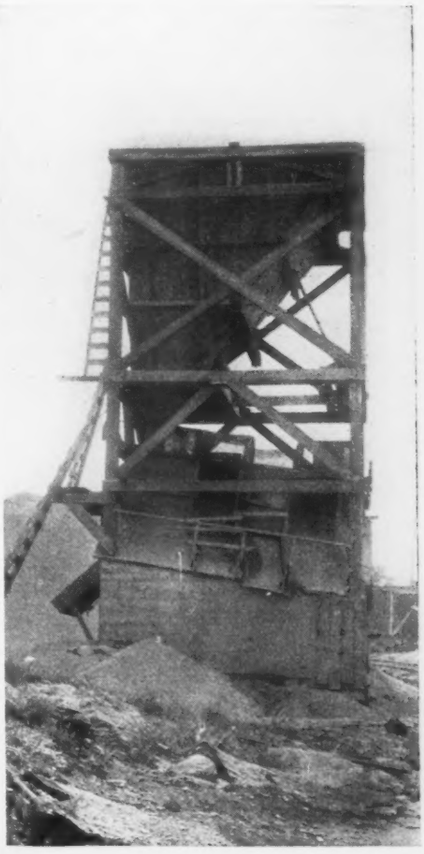
All the products of the washing plant are loaded on cars, but if the cars are not to be shipped at once they are drawn to one of the plant stockpiles and unloaded. There are three cranes used for this and for the work around the blast sand plants. One of these is a Browning and one a McMyler Interstate. The crane used principally around the blast sand plant is a Bay City Industrial with a very long boom.

Sand blasting sand—usually called blast sand—is made in a separate plant. Arrangements are such that the sand may be sized wet and afterwards dried or it may be dried first and then screened. Dry screening is the method most used, although wet sand may be stored wet and dried as needed, which is somewhat less expensive than storing the sand dry.

In the more usual way of working the sand is brought from one of the washing plants in cars that are unloaded on a stockpile over a tunnel. This tunnel is at the foot of an incline and cars are let down into the tunnel by a hoist which is placed above the dryer. The cars are filled from gates in the roof of the tunnel and then drawn up to the hopper of the dryer where they are discharged.

There are two dryers, one of these being a recent acquisition which was just being put in place at the time the plant was visited. Both dryers were made by the American Process Co., but they are built to the Monantico Co.'s own design and specification. There are no cells on the inside of the tubes but rather deep baffles, especially at the feed end. One dryer is 60 in. in diameter and 24 ft. long. The other is 48 in. in diameter and slightly shorter.

Coal is used in firing and any slight discoloration from its use disappears in the screening.



Screening plant used for making stucco pebbles and filter bottom pebbles

Close-up of blast and filter sand plant showing discharge of fine undersize at left

There are two sets of screens used in making the various sizes, and each has its own elevator that brings up the sand from the hopper into which the sand is discharged after it leaves the dryer. One set consists of plain gravity screens, the other of two cylindrical revolving screens. Each so far as the writer was able to judge does about the same quality of work. Both require occasional brushing and beating on account of the "blinding" that comes from the presence of grains slightly larger than the screen mesh.

The various sizes fall from the screens to bins with the exception of the No. 1 size, the finest size made, which has to be screened. This size is run over a Sturtevant Moto-Vibro screen which takes out all the fines, minus 30 mesh. These fines are the tailings of the plant and are discharged outside the building. They are sold principally for engine sand.

Filter Sand

Besides blast sand the plant makes a number of special sands. These have to be made to pretty definite specifications as to size and voids. The specifications vary because the work of the sand filters in which they are used varies. Many boiler plants have filters which do not need such efficient filtering mediums as the filter for domestic purposes but which do require great capacity. In these filters a coarser sand and one with more uniform grains can be used.

Small gravel for the under part of filters is also produced and finds a sale at long distances from the plant. The spherical shaped pebbles are unusually good for filter work and shipments of filter gravel and sands are regularly made to distant points, some as far away as Oklahoma.

Special Gravels

In fact this company makes a great many special sands and fine gravels, selling them for use in stucco and pebble dash work and various other purposes. A neat little rotary screening plant has been erected for filling orders of this kind. The hopper is filled by a locomotive crane and the products run to small stock piles from which the crane loads them into cars. Some of the gravel is re-screened over gravity screens as it is loaded into cars in order to insure its freedom from fines. The same screen is also used when any special size of gravel is needed for an order.

Hugh Haddow, vice-president and manager, Monontico Sand and Gravel Co., is well known in the industry from his long connection with the National Sand and Gravel Association. He has been a member of the executive committee for some years, and is considered an authority on all subjects pertaining to the production and marketing of sand and gravel. Much of his time in later years has been given to the work of the association and its success has been in no small degree due to his efforts.

The president of the company is John Murtland, Atlantic City, N. J., and Alex Vollmer, Atlantic City, is secretary.

Walter Bornemann is manager of the plant and Charles Beck is superintendent in charge of operations.

A Novel Use of Concrete

AN unusual use has been made of concrete by the City Park Zoo at Denver, Colo. Artificial rocks have been constructed of reinforced concrete to provide natural habitat enclosures for the animals. So realistic are these rock-like structures that it is impossible to distinguish them from actual rock formations on Dinosaur Mountain, 18 miles southwest of Denver.

The concrete was so colored as to reproduce rock stata by adding mineral pigments to the concrete while it was being mixed. The most difficult problem was the construction of forms showing all the markings of crevices, erosion marks, projections and cracks and any other irregularities found in natural rock.

Plaster casts were made of actual rock formations that were to be imitated. To make these molds the rocks were first covered with about one-half foot of clay, over this covering of clay a mixture of hemp and cement was made. As soon as the cement had set sufficiently, the covering was removed and the clay scraped away. The space which previously was occupied by the clay, was filled with glue. From these glue molds plaster casts were made. The concrete was then carefully tamped into these molds and when it had set sufficiently the molds were removed. The result was an exact reproduction of the rock as found in nature.—*Norristown (Penn.) Register.*

Phosphate Companies in Idaho Seek Lower Freight Rates

THE commercial organizations of Bear Lake county, Idaho, are making a concerted effort to secure lower freight rates from Idaho to the Pacific coast, so that the phosphate industry there may be revived, according to the *Pocatello (Idaho) Technicad.*

According to Mr. Campbell, Idaho state inspector of mines, the phosphate lands of southern Idaho total 1,500,000 acres and contain over 5,000,000,000 tons of mineable material. These lands are along the Oregon Short Line railroad over which many empty cars are taken northwest daily to be loaded with lumber for eastern points. The railroad company has promised a reduction in rates on condition that an order for 50,000 tons or more be shown. Such an order, producers claim, is impossible until rates are reduced at least $1.50 per ton to Pacific points, with important reductions to all other points.

A letter, protesting against unfair discriminatory freight rates, was sent to the interstate commerce commission, signed by the Idaho Phosphate Mining Co., R. C. McIntyre, manager; Bear Lake Phosphate Co., Earl Shepherd, secretary and treasurer; Paris Commerce Club, J. L. Dunford; Montpelier Commercial Cub, H. E. Nuckols, president; City of Paris, Idaho, by mayor; City of Montpelier, by G. F. Ashley, mayor.

New Diatomaceous Earth Company Operating in Nevada

ACCORDING to Nevada papers the Rock Products Co., of Reno, Nev., has opened a deposit of diatomaceous earth nine miles west of Reno and is manufacturing flooring, shingles and other products by pulverizing the rock as it comes from the deposit and mixing it with magnesite.

The Rock Products Co., has spent a large sum of money in conducting exhaustive tests at its plant and is now ready for commercial production. The factory in Reno will supply the needs of the territory east of the Sierra, while a mixing plant just completed at Emeryville, the manufacturing district of Oakland, will take care of the Coast trade.

Exhaustive tests, it is said, have established the fact that flooring made of the mixture will not check, crack or shrink and that the shingles, in addition to these advantages, will not warp.

Floors of the new material have already been laid in a number of business buildings in Reno.

The company is composed of some of the leading business men of Nevada, C. E. Clough being president, Paul Butler, vice president, Frank Norcross, secretary, T. O. Ward, treasurer, T. E. Maher, director, and W. J. Walmsley, general manager. Mr. Walmsley was formerly superintendent for the Pacific Portland Cement Co.

Will Hear Application for Lower Cement Rate in Washington

THE application of W. F. John and Co. of Seattle, Wash., for a reduction of $1 a ton in the freight rate on carload lots of cement from Seattle to Yakima, Wash., and intermediate points, will be heard by the state Department of Public Works, according to a notice received by J. L. Hughes and Sons, representatives of the Seattle firm. The complaint was filed against both the Northern Pacific and Chicago, Milwaukee and St. Paul railways.

The present tariff charged by the Northern Pacific is 21½ cents a 100 lbs., which is $4.30 a ton. The reduction sought would make the rate $3.30 a ton. If it is granted, the price of cement will be lowered proportionately to builders, which would stimulate construction work considerably, in Hughes' opinion, especially that of cold storage plants. He claims that the 21½ cent rate per 100 lb. on cement from with other rates.—*Yakima (Wash.) Republic.*

New Lime Plant of the Batesville White Lime Company, Arkansas

Three Wood-Burning Kilns and Hydrating Plant Ready to Begin Manufacture in February

By Tom Shiras

THE Batesville White Lime Co., formerly the Arkansas Lime Co. of Ruddells, Ark., has under construction near Batesville, Ark., at this time one of the largest lime plants in Arkansas or the Southwest. Work on the plant started in the spring of 1924, and is nearly completed. It will probably be ready to burn lime sometime during the month of February.

The plant is the result of a two years' search for stone that would burn a pure white lime, containing those other qualities essential to a high-grade product. Practically every large deposit of limestone in the north half of Arkansas was prospected before the present site was settled on. Even after they found the stone they spent a full year testing the deposit for quantity and quality. Comparative analytical tests were made from lime burned from all parts of the deposit, and they got a product running 99.34 calcium oxide. It is also low enough in arsenic to permit its use in the manufacture of cereals and fruit products.

The new plant is located five miles west of Batesville, at Limedale, on the Cushman branch of the Missouri Pacific railroad. The quarry is two miles from the plant, near the little village of Bethesda, connected with the plant by an industrial narrow-gage railroad.

The stone is Boone limestone, free from silica and other substances detrimental to a perfect lime. The quarry when opened up will have a face some 30 ft. high and half a mile long, with plenty of stone and acreage behind it to insure raw material for constant operation for almost an infinite period. The stone outcrops, and practically no stripping will be required. Primary drilling will be done with a No. 4 Keystone well drill. Holes 5⅝-in. in diameter will be sunk from the top to the floor of the quarry, and will be shot with heavy charges of powder. The secondary drilling will be done with Sullivan rotator air drills, the air being furnished by a Chicago pneumatic direct-connected air compressor. The stone will be hand sledged, and all that size that can be handled by one man, loaded into 2-yd. Koppels steel cars and transported to the kilns by a 7-ton Whitcomb gasoline locomotive. The kilns will require some 250 tons of stone daily, which will be furnished in four trips with the equipment described. The finer stone will be handled through a jaw crusher and screening plant and sold as concrete aggregate.

Wood-Burning Kilns

The plant will consist of three direct flame shaft kilns with a capacity of 600 bbl. a day. Wood will be used for fuel, for the reason that wood-burned lime commands a premium on the structural lime market. The reason for this is that the lime is burned more evenly and makes a more uniform product than lime burned with coal, gas or other fuel. The concern has 50 years' wood supply in sight.

Mechanical Handling

After the lime is burned it goes direct from the kilns into steel carts, where it is cooled. After cooling it is hauled to the different departments by storage-battery trucks.

All the lump lime is packed mechanically. It goes from the kilns to a No. 1½ Sturtevant rotary crusher, where it is reduced to 2-in. size. The 2-in. product goes to two air-tight steel tanks of 150 tons capacity each, where it is bagged and barreled by Howe's packers. The fines go to the hydrating plant.

Hydrating Plant

The lime to be hydrated goes from the kilns to the hydrating plant. It is first passed through a No. 1 Sturtevant crusher and elevated to the ground lime storage tank, a steel tank of 70 tons capacity. From this tank it goes into a 6-cylinder Kritzer hydrator with a pre-determined amount of water, sufficient to insure perfect hydration. After it comes from the hydrator it is passed through a No. 0 Raymond mill, which takes out all of the foreign matter by air separation. From this mill it goes into a 15-ton steel tank, from which it is fed by gravity into a 4-tube Bates packer. Power for the hydrating plant will be furnished by a 100-hp. Type Y Fairbanks-Morse oil-burning engine.

With this equipment the Batesville

Plant of Batesville White Lime Co. The picture was taken while the plant was under construction

White Lime Co. will manufacture the following products: Chemical and structural hydrated lime, crushed and sized quicklime in liquid-tight barrels of 180 lb. each, crushed and sized quicklime in waterproof jute bags, hydrated lime in 5-lb. bags for domestic use, fine ground lime for use in the manufacture of glass, agricultural lime, selected medicinal lime for druggists and hydrated lime for use in sweetening cream in creameries.

The Batesville White Lime Co. will continue the operation of its plant at Ruddells, Ark. Both plants will have a combined capacity of 1000 bbl. a day. The principal products of the Ruddells plant will be agricultural and chemical lime. The pulp and paper industries at this time are using large quantities of chemical lime and the demand is increasing in the locality served by this plant.

What Form of Lime Is Best for Agriculture?

By Alva Agee, in the "National Stockman and Farmer," Pittsburgh, Penn. Discussion by a Writer Who Has No Bias

IN the first week of September I watched a train of 100 carloads of pulverized limestone come into the county seat of Westmoreland county, Pennsylvania. This limestone had been sold to the farmers of the county, and the coming of the train had been made a feature for the movies and an opportunity for a farmers' meeting in town. Such a sale by a single manufacturer is evidence that the efficiency of raw limestone in correcting soil acidity has been well demonstrated, and yet I am asked whether this materal is as dependable as burnt lime for immediate effectiveness, and there is a good basis for such a question if the limestone is not fine.

Carbonate of Lime

An acid soil needs carbonate of lime. Until recent times this form of lime was secured in marl, which is finely divided and easily distributed, and also in limestone. The limestone material could not be distributed in its original form, of course, and the only known way was to burn it and slake it. If it was water slaked it became hydrated lime, and when distributed in the soil it quickly became a carbonate, and that is what the soil wants. When the limestone was burned it lost weight, but the material forced off had no value, and when moisture and air brought the material back to a carbonate form it was like the original limestone, only very fine so that the soil acids could combine with it.

Pulverized Limestone

Within the present generation, for the most part, power to divide the limesone into minute particles has come into wide use. It takes more power to make the particles very fine than it does to leave a portion of them somewhat coarse. The question has been to determine how much power should be employed in this work, because added power means more expense. If the limestone were made as fine as flour there could be no reason for ever raising the question whether such material was not as immediate in action and as valuable as the burnt limestone when air-slaked in the soil.

How Fine Should It Be?

Now we have not been left in the dark on that point. Our experiment stations and practical farmers have been testing the matter thoroughly. We know that when a limestone has been pulverized to the degree that the coarsest particles will go through a 20-mesh screen a large part of the material is so fine that it has all the availability any one could desire. That is to say, when limestone of this grade is mixed with the soil in sufficient amount to take care of the continuing needs of the clover plant during its two years of life, the finest portion of it meets the need of the clover plant without any apparent delay.

We are concerned all the time about the cost of correcting the soil's acidity sufficiently to insure clover sod. If we buy limestone that has been burned and slaked, considerable expense has been incurred in the process, and that must be paid for by the man who uses the material. If he is using it in small amount, and especially if he is drawing it a considerable distance from the station, he may find that it is a good purchase, because some worthless weight has been taken out and there is immediate effectiveness. Also we know that if the limestone has been pulverized to a high degree of fineness, considerable expense has been incurred in the work, and again it may be the best purchase for the man who is not using as much lime as the land needs and wants its full effects while the clover plants are starting growth. That is to say, in either case there has been added expense to get all of it immediately available, and I believe that usually it is poor practice to add to the cost on this account, because additional need arises month by month in the soil, and lime material that may not dissolve immediately, but that becomes available as the season goes along, may be fully as valuable as the finest portion.

Losing Lime

There is plenty of evidence that when hydrated lime or extremely fine limestone is put into the soil in sufficient amount to take care of a crop rotation, a portion of it dissolves and passes out of the soil. If I were applying enough lime in any form to carry the clover plant through its two years of life, I should prefer that some portion of the material should not immediately dissolve in the soil, and it thus comes about that a limestone which has not been made extra expensive by being pulverized nearly to the fineness of flour, and thus kept lower in price, may be more valuable than hydrated lime or the finest possible limestone.

I do not mean that they have the same value per ton, because the hydrated lime has less worthless material in it as a result of the burning of the limestone, but I mean that when the actual lime content of each material is compared there are many instances in practical farming when preference should be given to that which has some portion that will not dissolve immediately.

What Experience Teaches

There is a vast amount of practical farm experience to support the statement that a limestone which has been pulverized so fine that all of it will go through a 20-mesh screen is good material for any land when the supply is made large enough to last during a crop rotation, or even through the two years of the life of the clover. We used to advise that the coarsest material should pass through a 40-mesh screen, and if the limestone is peculiarly flinty that statement may still be entirely accurate, but we cannot draw the line too fine in practical work, and some good authorities believe that we should not pay for the extra power and labor required to make it even as fine as the 20-mesh screen. In all cases, of course, we take into account the fact that a great part of it is very fine, and it is that part that enables the clover to make a good start. The slightly coarser particles are slower in being dissolved by acids, and it is that very thing that is an advantage when we make an application of reasonable amount.

Positive Statement

There are so many factors in every

farm problem that a conservative man does not like to be too definite in statement. On the other hand, we must go ahead and do the best we know how, and the statements regarding burnt lime, that becomes air-slaked in the soil, and limestone are as near a general truth as I know how to make them. If we fix the fact that fine pulverized limestone and the air-slaked form that burnt lime takes in the soil are identical in composition, and that by use of machinery we can make the limestone so fine that it is practically immediately available, our only problem is to know whether we should spend any extra money to have all of the material immediately available or whether we shall prefer to pay somewhat less and have a part of the material becoming available throughout the year and the following year.

There is no virtue in the burning of limestone so far as correction of soil acidity is concerned. It does give us a caustic form that may stimulate soil action, but that may do more harm than good. However, we bear in mind all the time that the burning of the stone drove off a large weight of worthless material. The slaking or hydrating added some weight, but not so much as the stone originally had. When we buy limestone that has been made sufficiently fine we should be able to get five pounds of it for the price that three pounds of lump lime would cost if we are measuring actual lime content. Other factors are the ease with which we store pulverized limestone and apply it to the soil. If I were applying just a little lime material to a quite acid soil with the hope that some clover would be secured regardless of the acidity—and that is a thing that often occurs—I should want immediate availability and pay the extra price to secure it. If I were applying lime in some form to take care of the crop rotation, or even of the clover during its two years of life, I should prefer that some portion of it should not be fine enough to dissolve at once.

Times have been hard, labor high priced and freight rates high. These things have checked the use of lime on land. The future has somewhat more hopefulness in it, and we shall see a renewed interest in putting land into such condition that clover can work for us and other crops can get more out of the plant food in the soil. It is a great thing to have at least two or three fields in the farm that largely take care of the fertility problem through a heavy clover sod every three or four years.

California Highways Being Built at Less Expense

IN his report to the commission, State Highway Engineer R. M. Morton of California explains in detail his reorganization of the engineering forces, and the organization of three new divisions. Despite these steps, overhead charges show a decline from the previous biennium.

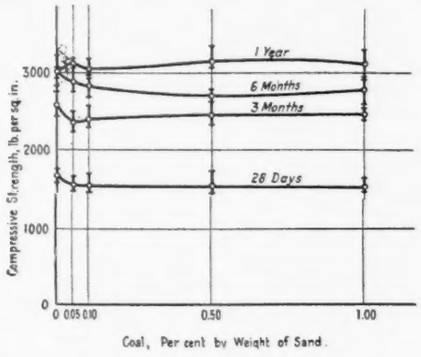
Contract prices also show a drop from the average of the previous two years. Average grading costs dropped from 78 cents a cubic yard to 74 cents; cement concrete from $15.75 per cubic yard to $13.40.

Strict laboratory control and investigation of all materials has resulted in an increase of the average strength of concrete going into state highway pavements. Research work has been greatly expanded and a detailed study of soil conditions throughout the state highways has been made. Daily tests of pavement aggregates on all contracts are made.

Effect of Lignite on Concrete Sand

LIGNITE has caused a lot of trouble to the sand producers who operate on the Mississippi, Missouri and some other rivers, especially since the colorimetric test for sand came into use. For the presence of even small quantities of lignite will show so dark a color with the standard solution of caustic soda that it would be rejected immediately in a locality where tannic acid was found as an impurity in sand.

In a locality where lignite is the only impurity found in sand a dark color merely indicates that strength tests should be made —unless there is already data from previous tests on the sand. If previous tests have shown that the sand would make good concrete the colorimetric test should be disregarded.



Effect of lignite in sand

Not that lignite is a good thing in concrete sand. It "pops" in finishing and hurts the appearance of the work. In larger pieces it slakes. It has no strength to speak of and it injures gravel even more than sand. It is a deleterious element and as such should be removed when a method can be found to remove it.

But in ordinary mass concrete its presence in finely divided particles and in small percentages has so little effect on the strength of concrete that the sand containing it may be used with perfect safety. This is the conclusion drawn from years of experience in localities where such sand has been used, and now this conclusion is backed by the evidence of investigators who have gone into the matter in a scientific way.

A paper read at the meeting of the American Society for Testing Materials at Atlantic City last July describes in detail the investigations carried on by I. F. Morrison and H. R. Webb, both professors in the University of Alberta, Canada. The reason for the investigation was to decide whether sand containing lignite, used by the city of Edmondton, was fit for making concrete.

Lignite was mixed with the sand used in making the concrete testing cylinders after the sand had been thoroughly washed. This washed sand gave a light straw color with the colormetric test. The lignite was added to the samples in percentages from zero to 1%, and the colors given by the various percentages from 0 to 0.1% are shown in the following table:

Lignite Per Cent	Color Scale No.	Approximate Color
0.000	24	Light straw; between Figs. 1 and 2*a*.
0.005	15	Dark straw.
0.015	12	Brown, like Fig. 5*a*.
0.030	9	Dark brown.
0.050	7	Very dark brown.
0.100	(?)	Diluted with equal parts of water, gave a No. 5 color. Very dark brown.

The actual percentages in the sand used in making concrete were 0.05, 0.10, 0.50 and 1.00%. The concrete mix had the following characteristics:

Fineness modulus	5.68
Water-cement ratio	1.04
Consistency	1.20
Flow	170- 180
Average slump	½ in.

The cylinders were cured and tested in the usual way after 28 days, 3 months, 6 months and 1 year. The results are given in the diagram accompanying this. It will be seen that there was an increase in strength from 1500 lb. in 28 days to a little over 3000 lb. in one year, so there is no evidence of the "slow deterioration" that has been spoken of in some places as one of the effects of lignite in sand.

The chart shows a very slight difference in the strengths of the concrete containing no lignite and that with the various percentages of lignite up to 1%. So nearly as it can be read from the chart the strengths are 1630 and 1500 lb. According to the authors, the decrease in strength due to lignite was about 8%.

The tests undoubtedly show the slight effect of lignite on the strength of concrete, but they would have had a greater general value if they had been made with a standard sand or at least a sand that was free from all impurities. The sand actually used, obtained from a local pit, contained 90% of quartz grains, 5% of feldspathic material and "less than 5% of pebbles and grains of dark shale, coal and other impurities."

Hints and Helps for Superintendents

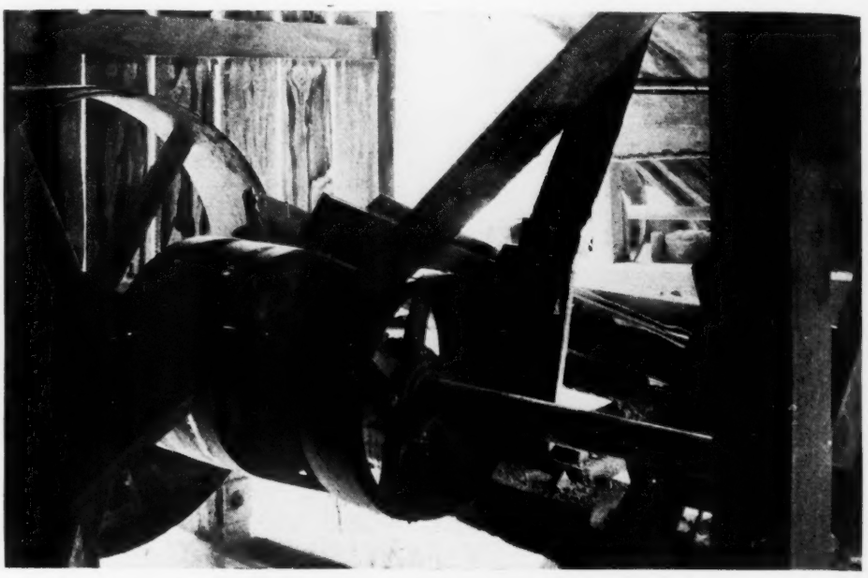
An Unusual Method of Blasting

THE *Du Pont Magazine* in its current number shows an unusual method of loading and blasting well-drill holes. It is described as follows:

"The drilling consists of two rows of holes 5½ in. in diameter and staggered along the face. The front row is 12 ft. from the face, and the holes are spaced 12 ft. apart and are drilled only 47 ft. deep, stopping 13 ft. above the quarry floor and near the center of a bottom hard ledge. The second row of holes is 24 ft. from the face. These holes are spaced 12 ft. apart, and are arranged so as to be between the holes in the front row. The holes in the back row are drilled 62 ft. deep, or 2 ft. below the water seam that forms the quarry floor. The accompanying graphs show their position.

"The front row holes are each charged in the bottom with 30 to 35 lb. of 40% straight nitroglycerin dynamite and one 50-ft. electric blasting cap. Then they are tamped with sand to the top. The back row holes are each charged in the bottom with 125 lb. of 40% gelatin dynamite and one electric blasting cap, and then tamped with sand up to within 20 ft. of the top. Here they are each loaded again with 25 lb. of 40% straight nitroglycerin dynamite and one electric blasting cap, and similarly tamped with sand to the top. Connections for firing are made in parallel, and a 220-volt alternating current is used to fire the shot.

"The stone is not only well broken up, but is scattered just far enough for three cuts of the shovel. This method produces over 7½ tons of stone per pound of 40% du Pont dynamite used."



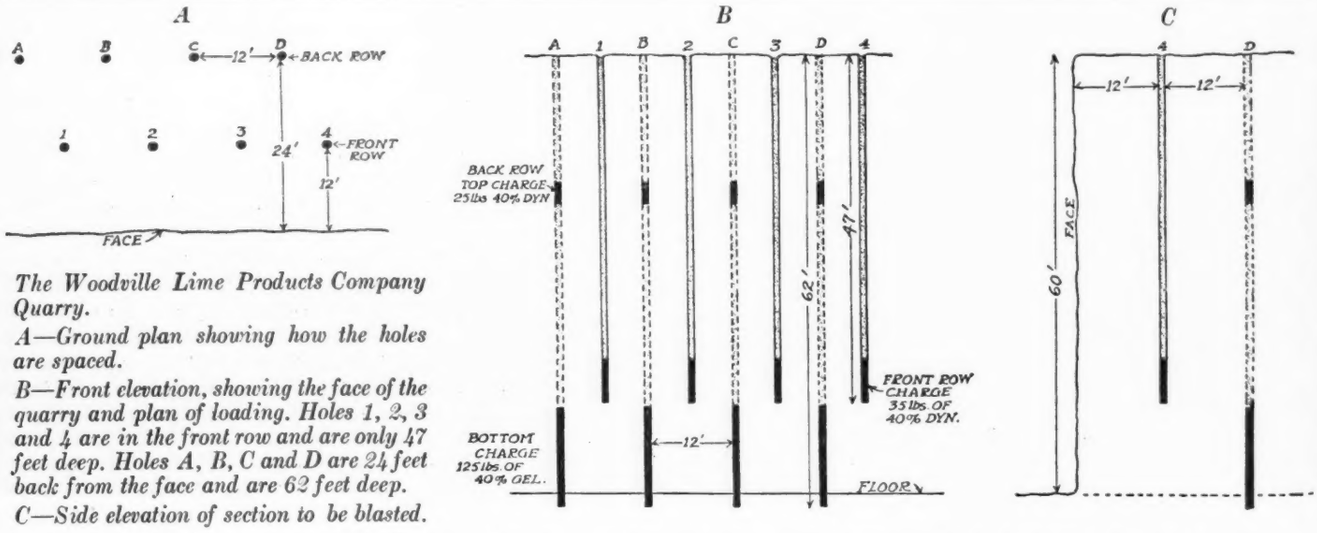
A pulley on a line shaft used as head pulley for conveyor

Small "Home Made" Belt Conveyor

AT the plant of A. B. Cooper, Inc., near Johnstown, Penn., a small belt conveyor was wanted to bring back the oversize of the main sizing screen to the crusher. There was only a little of this oversize, so small an amount that an 8-in. belt would carry it. The shaft from which both the crusher and the screen were driven was about half way between the two, and a pulley placed on this shaft served as the headpulley for the conveyor. Another pulley was put in bearings on the other side of the screen for a tail pulley.

The belt ran pretty fast for conveying and the stones jumped off the belt, so boards were put in on the sides to form a trough. After this was done there was no further trouble and the belt has run satisfactorily for a long time. The wear on the belt is said to be slight.

This belt is in the trap rock crushing plant of the company which also operates a plant for crushing sandstone. It shows considerable ingenuity on the part of its builder, for ordinarily no one would think of using a pulley on a main drive shaft as the head pulley of a conveyor. A. B. Cooper, Jr., who is in charge of the plant, designed and built the conveyor.



The Woodville Lime Products Company Quarry.

A—Ground plan showing how the holes are spaced.

B—Front elevation, showing the face of the quarry and plan of loading. Holes 1, 2, 3 and 4 are in the front row and are only 47 feet deep. Holes A, B, C and D are 24 feet back from the face and are 62 feet deep.

C—Side elevation of section to be blasted.

The diagram shows the loading of the holes and sand tamping used in the method of blasting described

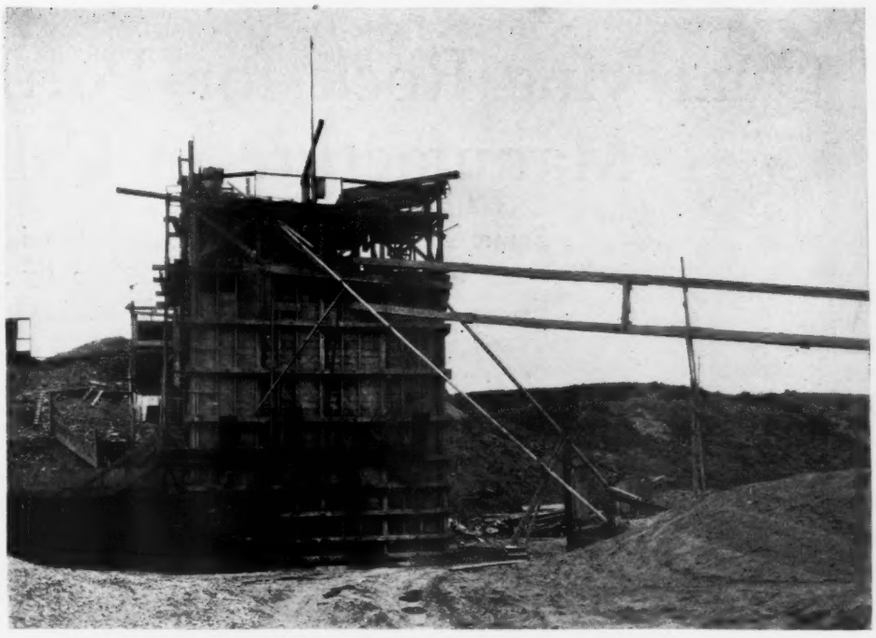
Pumping from Sand Stock Pile

AS every operating man knows, there are many ways of recovering material from stockpiles. There is also more or less difference of opinion as to which is best.

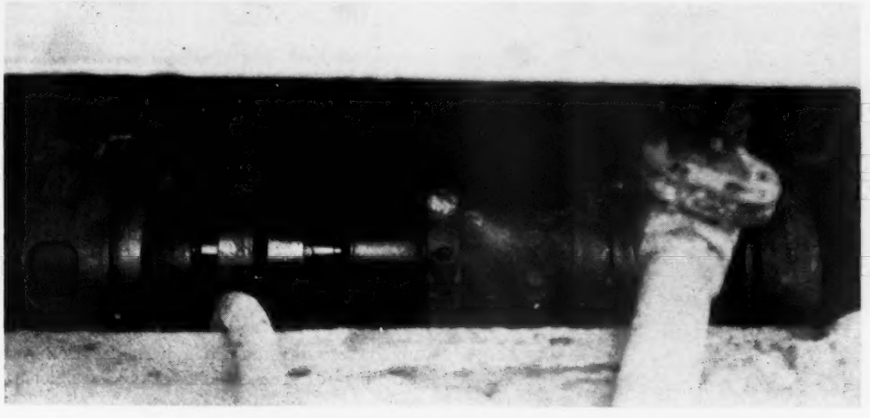
The views herewith show how one sand and gravel operator solved the problem. F. B. Orman, of the Orman Crushed Rock Co., Pueblo, Colo., is the man, and he describes the installation as follows:

"We are using a Wilfley pump for the purpose of pumping up and rewashing sand from a stockpile (a portion of which can be seen in the foreground near the pump). We have 250 gal. of water going through per minute, and in an eight-hour shift we are able to pump up about 100 cu. yd. of sand; the lift is 65 ft. and the slope of pipe is 45 deg. This pump has a 6-in. intake and a 4-in. outlet, and, as those familiar with this pump know, it has no suction. The water and sand go into a sump. At the present time we are feeding sand to the pump with a fresno."

It is not to be supposed that this is an exceptionally economical method of rehandling the sand, but it filled the needs with a minimum of equipment and accomplished two things that may be desirable at some other plants; namely, it rewashes the stocked material and loads it out through the bins.



Plant of the Orman Crushed Rock Co., where pumping is used to convey material to stockpiles



Pump and motor used for stockpiling. This pump has no suction so it is set below a sump into which material is drawn by a scraper

A Simple Shaking Screen

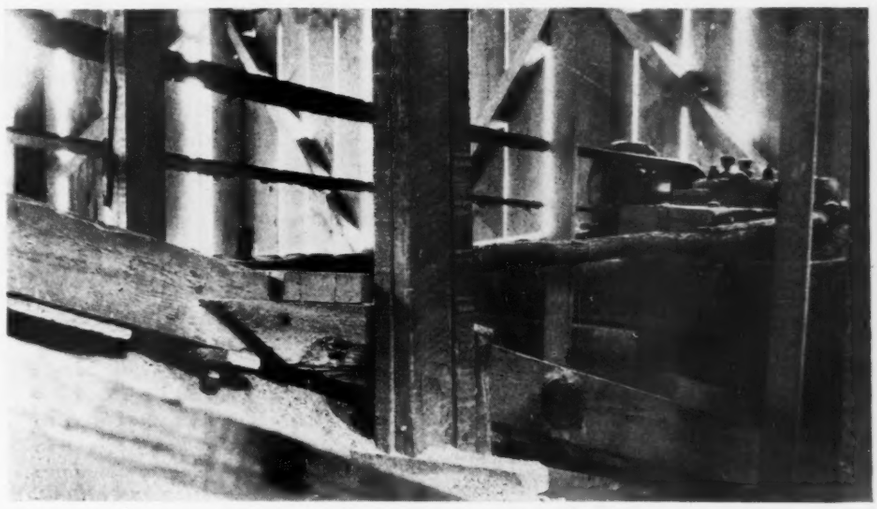
THE shaking screen shown with this is at the plant of A. B. Cooper, Inc., near Johnstown, Penn. It was designed and built by A. B. Cooper, Jr., who is in charge of the plant. It is used to screen crushed sandstone, taking out a product from ¼ in. down, to be sold as concrete sand.

The screen frame is a simple rectangle of 2x6-in. timbers suspended by four slats of hard wood. These are bolted to the joists of the floor above. They bend back and forth each time that the screen moves. Thus they act as springs as well as supports.

Motion is communicated to the screen through a pole of locust wood about 2 in. in diameter. One end of this is fastened to the screen frame and the other to a crank on the end of a short shaft in a bearing.

On the other end of this shaft is the pulley, which is belted to the main shaft of the plant and a flywheel. The screen would not work well until the flywheel was added. The pulley, flywheel, and crank are shown at the right of the picture and in front of it are two of the slats by which the screen is supported.

Although it has been run for some time, no effect of shaking the building has been noted. Perhaps this is due to the spring connections. The four slats of hard wood are springs, and the pole which runs from the drive shaft to the frame is a spring, and it is possible that much of the bad effect of the shaking motion is absorbed by these.



Showing how the screen is suspended by wooden slats. A locust sapling cut near the plant makes a springy "pitman"

Quarrying Rock for Portland Cement Manufacture in California

Some Constructive Criticism on Methods of Quarrying and Underground Operations by a Mining Engineer Familiar with Similar Work in Other Fields

By Robert Marsh, Jr.
Consulting Mining Engineer, San Francisco, Calif.

THE following outline study of quarrying and mining methods in use in California cement operations has been digested from notes taken on a tour of inspection of the principal crushed rock and cement quarries in the state:

When a mining engineer, familiar with open-pit mining methods as employed in the metallic and non-metallic open-pit mines of the United States, studies the methods of quarrying cement rock in the quarries of California he is likely to be impressed with several things of local interest.

In the first place he will usually find that apparently more thought and study have been given to other branches of the cement making business than have been given to quarrying and mining. Some of the reasons for this are to be found in the peculiar nature and occurrence of so many of the limestone deposits; in the rapid growth of the demand in recent years for cement and lime; and because the average quarryman has not had time or opportunity for extensive study of open-pit operations in other fields.

In amplification of this, it is of importance to observe that large deposits of cement rock of a uniform grade, and well defined constant geologic structure, are the exception in California. Most of the deposits are relatively small, of variable grade, steeply tilted, and often highly metamorphosed. A number have been depleted, and many others have not been carefully or systematically prospected. They thus differ radically from the great, gently dipping beds of limestones one finds in so many quarries of the eastern and central states. The usual California conditions have not been conducive for long time, far sighted layouts, and it is not surprising that the most modern economical methods have not generally been developed in the quarry work. Again, the rapid growth of the cement industry of the state has made it necessary to expand the old quarries of small output into larger ones, making the best of the conditions as found, and keeping the operating personnel busy on their own local problems. But recently the more progressive stronger companies have realized the advantages to be gained by sending their quarrymen afield to study the progress and methods developed elsewhere in open-pit mining work. They have also begun to engage the services of engineers of wider experience to study their conditions. Although mining by open-pit methods is likely to continue to best cover the majority of such exploitable deposits of cement material, it sometimes occurs that underground methods are more profitable. Again, owing to the scarcity of suitable and well located deposits of limestone, the mining of shell deposits from the coastal ocean floor, by the use of dredges, has recently been commenced.

Robert Marsh, Jr.

THERE is nothing so helpful to an industry as constructive criticism.

This is especially true when it comes from one who is outside the industry and who approaches its problems with a fresh point of view.

The writer of this article is a consulting mining engineer of wide experience, familiar with open pit mining (or quarrying) in the great copper mines and similar industries of the West and Southwest. Some of the keenest engineering minds in the world have been at work on the problems of these industries, which are practically the same as those encountered by rock products quarrymen. The author's experience, therefore entitles him to write frankly of what he saw in an inspection of California mines and quarries and to criticise it.—The Editors.

Quarrying in Benches

Owing to the foregoing conditions, the usual method of attack in opening a quarry has been a single quarry floor at a convenient elevation. Then from this floor the quarry is beaten back into the hill as a single face, regardless of its height or the attitude of the formation, in the best way presented. As a rule it does not appear that much serious study has been given to the working of these deposits by developing benches of uniform moderate height. The reasons for this are often found in the topography and structural attitude of the deposit. To use bench methods would have entailed serious problems in trackage, different methods of blasting than those in general use, and probably a considerably larger initial outlay of capital.

Some of the deposits, however, could have been benched to much advantage, while others should not have been opened as open-pit quarries, but rather as underground mines. Under suitable conditions there is no question in the minds of engineers today but that bench methods are greatly to be desired over the old method of working very high single quarry faces. There is still, of course, the discussable question of just what height of bench is most advantageous, but this problem is dependent on such local factors as the topography, the hardness, attitude and structure of the rock, method of blasting desired, output, and size of shovel equipment to be employed. From experience covering many deposits where the rock is as hard as average limestone, it has been found that the benches give best results

when they do not exceed 50 ft., and are not less than 25 ft. Where the rock is comparatively hard, the lower limit of 25 to 30 ft. usually works best, but for a softer formation the height may be increased to the upper limit. Some of the California quarries could be bench mined to advantage, using benches within these limits.

Methods of Blasting

The method of primary blasting commonly employed in California is "coyoting." Since so many of the quarries are carried with a single bench, ranging in height from 100 to 300 ft. or more, it is possible to employ this method economically. Again, in most of these quarries, the limestone formation dips at high angles, thus differing from the gently bedded deposits of the East and Middle West. Such steeply dipping strata favor coyote blasting for two reasons. In the first place it may prove difficult to keep well drill holes straight, or they may have a tendency to "ravel" or "fitcher"; secondly, good results can generally be expected from tunnels and tees because, although the explosive is concentrated at the bottom, the toe is kicked out and the overlaying material collapses and breaks fairly well in falling. Such results could not be expected with horizontal strata. Coyote blasting, of course, permits of the use of low grade, cheap powders, whereas, with well drills a higher grade of powder is generally required. In some quarries of the West, where rock is sought for road and building purposes, it is so tough and hard that churn drill holes would become very expensive to drill.

But the working of such very high quarry faces, with coyote blasting, often lacks much of being entirely satisfactory. Very often it leaves the blasted material with a large proportion of oversize which must be further broken by secondary blasting. It also leaves a bank that must be kept carefully trimmed if it is to be safe to work against. These two factors tend to lower the efficiency of the shovels and to increase the working hazards. Considering all of the present conditions, there is no doubt that the coyote method is preferable to either well-drills or machine drills so long as the high faces are carried. Coyoting, followed by secondary blasting with jackhamers (or in some cases, other types of machine drills) is the best that can now be done. But quarrymen should not lose sight of the decided advantages of bench mining and well drill blasting whenever their local conditions are such as to favor them, and some of the deposits in California do favor them.

Quarry Equipment

The equipment employed in California quarries covers a wide range, is sometimes poorly balanced and not standardized, and is often in part obsolete. Owing to the fact that most of the quarries carry very high faces shot by coyoting, there is generally produced a large amount of oversize. To handle as much of this as possible without secondary shooting, there is a tendency to employ shovels of far larger size and capacity than would be required under normal conditions of loading. But heavy shovels with big dippers are not only more expensive to purchase, but are more costly to operate, owing to larger crews, more fuel and more upkeep. Most of the shovels employed are of the standard railroad type mounted on M. C. B. trucks. The power is generally steam with oil fired boilers. They carry a crew of three men and from four to six pitmen. If the loading conditions were normal, I am sure that in most cases shovels of half the size, using but two operators and one to two pitmen, could readily load the required tonnage. Instead of a shovel of about 100 tons weight using a 4-yd. dipper, a shovel of about 50 tons weight with 1¼-yard dipper, of revolving type mounted on caterpillar traction, would be far more economical. I make no criticism of the steam-oil power so long as the price of fuel oil is so reasonable as at present. It is simple and well understood. But it is altogether likely that electric driven shovels would be cheaper to operate. There is also the Diesel and Diesel-electric driven shovel to consider. All of these types of drives are giving excellent results in open-pit mining and quarry work in many parts of the world.

Transportation

At many quarries the haul from the shovels to the primary crusher plant is comparatively short. For such short hauls, either locomotives of the electric storage battery type or the gasoline type are most economical and efficient, and they are giving excellent satisfaction in California. Both these types of locomotives are of comparatively small size because the tonnages hauled are not large, the trains are light, the cars are small, and the track grades are easy. Under such conditions steam locomotives would be less economical, and the centrally controlled electric system is considered too complicated to warrant further trial than it has already received. As a rule trolley electric systems are not desirable around shovel operations. It, therefore, seems that either the gasoline or the storage battery locomotive is best suited for this work when the haulage distance is not more than a mile, and the tonnage to be delivered is not greater than 2000 tons per day. For this class of service a track gage of 36 in. is preferable because of the ease of track shifting and the lower cost of trackage installation. But for longer hauls and heavier tonnage standard gage track and equipment is always to be preferred, especially if the equipment is to be used about the plant for switching or other general utility work.

At most quarries the short hauls and moderate tonnages do not call for heavy car equipment. Cars of about 10 to 12 yd. capacity are quite satisfactory. It is necessary that they be carefully and ruggedly designed to withstand the severe service of shovel loading. When they need dump but one way, doors are better omitted and the bodies may then be of the pan type heavily reinforced. Electric hoist dumpers are very satisfactory and require no extra operator at the crusher.

Machine Drills

Among the machine drills employed the jackhammers are well suited for blockholing for secondary blasting of oversize, but they are not suitable to drill holes 20 ft. deep or more for bank blasting. While their lightness makes them most mobile, they drill holes of small diameter and these holes must often be sprung from two to five times before they are sufficiently chambered to accommodate the necessary charge. Most of the other types of machine drills seen on a visit to these quarries were of an old type not suitable for drilling holes to depths of over say 8 ft. Where it is expected to drill holes to depths of 20 ft. or more, drills of the Leyner Ingersoll Type X 70 or Model 31 Turbro would prove much better. As previously mentioned, very few of the California quarries are now being mined in a manner suitable for the use of well drills, but in such cases where they could be bench-mined and blasted with well-drill holes, a 6-in. well-drill hole would, without springing, carry sufficient powder of 40% grade to properly break a bench of moderate height.

At the primary crusher plants the large jaw crushers are well suited to the work here, as they have proven to be elsewhere. Gyratory crushers are generally used for secondary crushing. The large sized hammer mills are being tried out at some of the plants, but it is a little premature to pass judgment on them.

The cost of mining and delivering the rock to the coarse crusher plants will probably vary between the rather wide limits of from, say 25 to 80 cents per ton.

It is a pleasure to visit the California quarries. The operating personnel is intelligent, courteous and greatly interested in discussing their problems.

Clinchfield Portland Cement Company's New Plant to Be Ready in June

SINCE work has started on the new cement plant near Coreen, Ga., the railway company has announced the changing of the name of Coreen station to Clinchfield, Ga. The owner of the new plant is the Clinchfield Portland Cement Co. The plant is 30 miles below Macon.

The plant will be ready to manufacture cement by May or June this year. It will have a daily capacity of 2000 bbl. of cement. The plant is to cost $1,000,000 when completed. Deposits used in the manufacture of cement are said to be plentiful in the section around Clinchfield, and the company has leased enough land to keep the mill operating for years.—*Atlanta (Ga.) Journal.*

Cements with High Percentages of Alumina

Their Discovery Caused by Search forCements to Withstand Sulphate Waters

[The following account of the discovery of high alumina cements is from the French *Bulletin de la Societe d'Encouragement* as translated for the British *Stone Trades Journal*.—ED.]

THE name aluminous cement may be given to any cement in which the weight of alumina is clearly greater than that of silica, it being understood also that the weight of silica plus the weight of alumina should be more than that of the combined lime and magnesia. Thus the composition is quite different to that of the ordinary portland cements. The latter do not vary much from the following:

SiO_2	21
Al_2O_3	7
Fe_2O_3	4
CaO	66
Mg.O	1
SO_3	0.50
Loss	0.50
Total	100

The composition of aluminous cements varies within wider limits, which may be epitomized as follows:

	I	II	III
SiO_2	5	10	15
Al_2O_3	45	40	35
Fe_2O_3	15	10	15
CaO	35	40	35

The iron indicated in the analysis as Fe_2O_3 always exists in aluminous cement, either in form of metallic iron or that of FeO or Fe_3O_4. Thus there is a great difference between this and portland cement.

It was during researches to find a product not decomposed by sea water containing sulplate of lime that aluminous cement was discovered.

Why Sulphate Waters Decompose Portland Cement

For a long time the noxious influence of lime sulphates and magnesia in artificial cement was ignored. Years ago, it is true, Capitaine Dolot drew attention to the fact that the fortifications of Paris were decomposed in places owing to contact of the mortar joints with gypsum, and M. H. Le Chatelier also noted decomposition in the Boulogne drains which he ascribed to lime sulphate.

Finally M. E. Candlot, who was working in the French cement laboratory, succeeded, with the advice of M. H. Le Chatelier, in demonstrating the formation of sulpho-aluminate of lime ($Al_2O_3\,3CaO$) 3 ($SO_3\,CaO$) which crystallizes with 30 or 32 equivalents of water, accompanied by an enormous expansion which disjoins the masonry. This sulpho-aluminate is generally known as "Candlot Salt." As far back as 1898, M. I. Bied had occasion to examine the Alicum viaduct and underground, in Spain in which there were inexplicable signs of displacement and disaggregation, which he found to be due to lime sulphate. Immediately the infiltration of sulphated water was checked all this ceased.

The attention of engineers being directed to this decomposition an increasing number of cases were found, so that it became urgent to find a binding material proof against the action of sulphated water.

Early Researches

On the advice of M. H. Le Chatelier researches were made by M. I. Bied, amongst the works on dehydrated clay by Vicat, which demonstrate that when kaolin or a refractory clay containing a great deal of kaolinite is burnt at a temperature of about 750 deg. C. they are transformed into an excellent pozzolanic material. Pozzolana, as we know, combines with lime in presence of water, so that a pozzolanic material in a lime cement will cause the free lime to combine, as setting proceeds, with the silica or alumina in the pozzolana, and formation of sulpho-aluminate of lime is no longer possible.

At the time when M. I. Bied recommended dehydrated clay as a pozzolana, M. Feret, the eminent director of the Roads and Bridges Laboratory of Boulogne-sur-Mer, was examining the properties of "gaize," a soft, siliceous clay found in large quantities in the Ardennes and which after a very slight burning is also a high class pozzolanic material.

The "Ciments Francais" Co. then put a "gaize" cement in the markets, while Messrs. I. A. Pavin manufactured a red cement with dehydrated clay under the name of undecomposable cement. Unfortunately pozzolanic cements have an inconvenience, owing to the fact that humidity is necessary to make the silica and alumina combine with the lime, so that the cement hardens with difficulty, especially in S. Algeria.

This gave the studies a different trend and still following the principles laid down by Vicat, who asserted that could a cement be produced in which the ratio

$$\frac{\text{Silica} + \text{Alumina}}{\text{Lime} + \text{Magnesia}}$$

was greater than I, this cement would be undecomposable, M. I. Bied endeavored to obtain a hydraulic binder meeting these desiderata. But, unfortunately, the silicates, three in number,

$$\left.\begin{matrix} SiO_2CaO \\ SiO_2 2CaO \\ SiO_2 3CaO \end{matrix}\right\} \begin{matrix} \alpha \\ \beta \\ \gamma \end{matrix}$$

are not all hydraulic. The mono calcic silicate $SiO_2\,CaO$ is always inert and the bicalcic is in three different forms, viz., α, β, γ; stable between 0 and 600 deg. C.; between 600 and 1400 deg. C., and above 1400 deg. C. The hot stable forms can be preserved cold by immersion, but, though the question has yet been little discussed, none of these silicates seem to have any great hydraulic value.

It is therefore impossible to make a cement of this type by increasing the percentage of silica. He therefore endeavored to produce one by raising the percentage of alumina.

There are four known lime aluminates:

$5Al_2O_3\,3CaO.$
$Al_2O_3\,CaO.$
$3Al_2O_3\,3CaO.$
$Al_2O_3\,3CaO.$

They may be classed with demi-calcic, mono-calcic, bi-calcic and tri-calcic aluminates. The properties of the demi and mono-calcic aluminates are very interesting and meet the requirements of Vicat, i. e., they are undecomposable in sea water, and the bi-calcic and tri-calcic set instantaneously.

These aluminous cements can be made like ordinary cements by clinkerization, i. e., by prolonged burning at a temperature near the melting point, but as they have a very small softening stage it is very difficult to obtain them in this manner, and hitherto it has only been possible to do so by fusion either with the water jacket or the electric furnace.

Aluminous Cement and Ferro-Concrete

This cement should be utilized not only for maritime works and sulphated water, but also for reinforced concrete. The rapidity in removing false work gives an economy which contractors can easily calculate and in one instance a request was made to substitute aluminous for ordinary cement without any increase in the contract prices. Consequently aluminous cement was subjected to tests in resistance to crushing, in reinforced concrete, both at the Paris Roads and Bridges Laboratory and the Lausanne Laboratory special attention being given to a cement made in an electric furnace at Valais, Switzerland. Professor Paris of Lausanne, who made these studies, specially directs the attention of consumers to the influence of the mixing water. He examined armored concrete pillars, the concrete in which was made with 90% water in weight of cement and 65%.

The resistance is much greater with the smaller quantity of water. In two days the resistance was 40% greater than the initial.

The pillars tested were square, 12.5 cm. on the side, reinforced with 12 bars, 8 mm. in diameter. The concrete was made with

650 litres of gravel, 650 of sand and 300 kg. of cement per cubic metre of the finished product. Professor Paris calculated the cost price in 1-1000 Swiss centime per kilogram and square centimetre for ordinary portland cement and aluminous cement (in Swiss francs).

	2 days	7 days	28 days
Ordinary portland	6.60 frs.	2.66 frs.	2.22 frs.
Aluminous cement	2.92	2.08	1.95

Thus aluminous cement is preferable from the point of view of the cost price per resistance kilogram. He also examined the co-efficient of elasticity of this cement, finding an average of 360,000 kg. per square centimetre, which is similar to that obtained at the Paris Laboratory. In the case of rupture of reinforced aluminous cement concrete girders, M. I. Bied noted that the cause was due to exceeding the limit of elasticity in the steel. Differently to what happens with ordinary cement girders no cracks are visible, even with a magnifying glass, and rupture is sudden without any warning. The girder sags considerably without cracking. Girders with a span of 4 m. and 16 cm. in height acquired, in rupture, a camber of 28 mm. in rise without cracking.

Elasticity of Aluminous Cements

Thus aluminous cement is much more elastic than ordinary artificial cement. Perhaps it would be well to employ it with steel possessing a high co-efficient of elasticity to attain the best results.

In any case, by making it possible to utilize thinner floors, the dead weight per square metre is greatly decreased. Thus the girders can be spaced and the slabs in an ordinary floor treated like squares, the amount of iron required then being less. When on a span of 6 m. it is possible to space the girders at 6 m. and have a square floor there will be a considerable decrease in the cost price of the work. It is not easy to make a forecast of the future of aluminous cement at the present time. No doubt but that if the cost price falls and does not exceed double that of ordinary cement, there will at once be a considerable demand. Large reinforced concrete constructions and those in sulphated places will utilize large quantities. Another further application will be for roads. At the present time trials are being made with some success with ordinary cement concrete, the roads are closed to traffic for some days, whereas with aluminous cement all traffic can be resumed 48 hours after the time of making the concrete.

A few words on manufacture of this cement. At the present time the method by fusion seems the only one utilized. The first pparatus for fusion and which, with perhaps some improvements kept secret, is still employed by the "Societe Anonyme des Chaux et Ciments de Lafarge et du Teil" is the water jacket with continuous run and slightly heated blast.

The difficulty with the water jacket is that the molten product from reduction of the iron oxide in the bauxite is transformed into steel with 0.6% carbon, and the melting pot must be kept very hot to run this steel which melts at a much higher temperature than the cement.

Electric furnaces have an advantage in countries without coal, like Norway and Sweden, but also disadvantages due to the fact that the resistance of the lime aluminates attains 2,000,000 μ 0 per square centimeter, while that of the silicates hardly exceeds 500,000 μ 0. Moreover, lime aluminate is employed as resistance in some laboratory electric furnaces. There is a very great advantage with the electric furnace from the mixture bauxite + lime, instead of bauxite + limestone, because the reaction $CO_2 + C = 2CO$ is very active with the latter mixture and involves very great wear of the electrodes.

Other methods of fusion are now being tested and it may, it appears, be asserted that the cost price of this cement made by fusion will shortly decrease.

Power Companies Compete for Cement Plant Contract

THE Kansas Utilities Co., with headquarters in Fort Scott, Mo., the Kansas Light and Power Co. of Kansas City, Mo., and the Kansas Gas and Electric Co., are in a three-cornered fight to furnish power to the Great Western Portland Cement Co., at Mildred, Kan., which is to manufacture cement for the Missouri Highway system, shortly to be in process of construction.

The Fort Scott company has financed a million and a half dollar corporation which stands ready to build the largest power plant in this section, if the contract is awarded to it. The Kansas Utilities Co. has grown very rapidly during the last two years and is now supplying electricity to 23 towns in southeastern Kansas. It has apparently become a dangerous rival to its larger competitors who, it charges, are trying to curtail its operations.—*Topeka (Kan.) Capital.*

Agitating for State Cement Plants

SEVERAL states have agitators who are introducing bills in the state legislatures which are just beginning their sessions asking to have the matter of state cement plants investigated or to have such plants built.

In Colorado, Senate Bill No. 162 has been introduced by Senators Young and Callen, asking for a state cement plant and a state brick plant and rock crushing plant as well.

In Arizona, Senator Moore of Navajo county has introduced a bill for the establishment of a state cement plant which carries an appropriation of $250,000. The bill provides that inmates of the state prison shall be used insofar as possible both for the construction and operation of the plant.

The proposal for a state cement plant in Wisconsin is noted elsewhere in this issue.

Lumnite Cement

THE Atlas Lumnite Cement Co., 25 Broadway, New York, has issued a special number of the *Contractor's Atlas* showing what Lumnite cement is and what it can do. An interesting page on which are reported tests made by the R. W. Hunt Co., Chicago, is reprinted here as it will give a clearer idea of the qualities of Lumnite than any other part of the pamphlet:

REPORT OF TESTS ON ATLAS LUMNITE CEMENT

SOUNDNESS (Boiling Test)

Six hours without any signs of cracking, warping or scaling.

SETTING TIME

	Initial Set Hrs.	Initial Set Min.	Final Set Hrs.	Final Set Min.
Vicat Needle	4	20	5	45
Gillmore Needle	5	25	6	30

FINENESS

Residue on No. 22 siexe 3.4%

TENSILE STRENGTH

1:3 Ottawa Sand Mortar Briquettes

(Results in pounds per square inch)

	1 day	2 days	3 days	7 days	28 days	3 mos.
Average	464	487	518	537	561	591

NOTE—The Standard Specifications for Portland Cement of The American Society for Testing Materials (C9-21) require for that material, tensile strengths of only 200 lb. per square in. at seven days and 300 lb. per square inch at 28 days.

COMPRESSIVE STRENGTH OF MORTAR

2 in. x 4 in. cylinders—1:3 Standard Mortar

(Results in pounds per square inch)

	1 day	2 days	3 days	7 days	28 days	3 mos.
Average	4725	4905	4940	4985	5004	5289

NOTE—The Tentative Specifications and Tests for Compressive Strength of Portland Cement Mortars (C9-16T) of the American Society for Testing Materials, require compressive strengths for that material of only 1200 pounds per square inch at seven days and 2000 pounds per square inch at twenty-eight days.

COMPRESSIVE STRENGTH OF CONCRETE

6 in. x 12 in. cylinders

Fineness Modulus of Sand was 2.97, and of pebbles 6.73. All compressive test mixtures were made with a 7 in. slump.

Test pieces were kept twenty-four hours in the moulds, under a wet cloth, and with the exception of the one-day test, were stored in damp sand until immediately before testing.

All pieces were capped with plaster of paris to insure an even bearing.

(Results in pounds per square inch)

Mix	1 day	2 days	3 days	7 days	28 days
1:1½:3	3287	4436	4656	4892	5639
1:2:4	2865	3351	3542	3860	3891
1:2½:5	2202	2269	2829	2934	2939
1:3½:7	1321	1364	1511	1565	1605

Bessemer Limestone and Cement Company to Expand

THE Bessemer Limestone and Cement Co., of Youngstown, Ohio, has authorized expenditure of $200,000 for additional storage capacity and mining equipment. The past year the company shipped 1,250,000 bbl. of cement compared with 1,202,000 bbl. in 1923. It shipped also a half million tons of flux stone for blast furnace use.—*Wall Street News.*

New Cement Rock Crushing Plant in Oklahoma

THE Atlas Portland Co., has purchased 680 acres north of Watonga, Okla., and will put in a rock crushing plant, it was announced recently. It will employ between 20 and 150 men.

The company will install rock crushers and ship to their plant at Independence, Kan.

The chief engineer and foreman of the construction crew have arrived and preliminary work has started.—*Oklahoma City (Okla.) Oklahoman.*

Convention of Sand-Lime Brick Association

Twenty-First Annual Meeting at Toronto Shows Real Progress Made by the Industry

THE twenty-first annual convention of the Sand-Lime Brick Association held at the King Edward hotel, Toronto, Ont., Canada, February 3 and 4, marked a milestone in the progress made by the industry. Production figures for 1924 were considerably in excess of the record established in 1923 and it can be safely said that 1925 will be the banner year for the industry.

Considerable progress has been made in the education of architects, contractors and builders as to the efficacy of sand-lime brick. It is being recognized more and more as a quality product and is being written into specifications. The educational work will continue and as it continues the industry will continue to prosper.

To Make Better Brick

An outstanding feature of the convention was the sincerity exhibited by all the manufacturers in their desire to make an even better brick then they are making now. The association is working in close harmony with the U. S. Bureau of Standards and many of the operators are working in conjunction with local schools and universities to determine the various properties of their brick and how they can be bettered.

The officers of 1924 were re-elected for 1925 with but the one exception of Vice-President H. W. Terry, Harbour Brick Co., Toronto. The personnel is as follows:

New Officers

President, J. Morely Zander, Saginaw Brick Co., Saginaw, Mich.; vice-president, Frank Waterman, Toronto Brick Co., Toronto, Ont.; secretary, G. W. Phelps, Flint Sandstone Brick Co., Flint, Mich.; treasurer, Allan G. Walton, Hummelstown-Brownstone Co., Hummelstown, Penn.

The following were elected members of the executive committee: W. H. Crume, Crume Brick Co., Dayton, Ohio; W. D. Macfarline, Winnipeg Brick Co., Winnipeg, Man.; Dr. A. S. Wolfe, National Brick Co., Washington, D. C.; I. G. Toepfer, Acme Brick Co., Milwaukee, Wis.; Otto Schwartz, American Brick Co., New Orleans, La.; C. H. Carmichael, American Brick Co., Boston, Mass.

The association voted to have the next convention at New Orleans, La., some time prior to the Mardi Gras, which usually takes place in February. This action will be referred to the executive committee and the proper date will be set by them.

Many interesting papers were read and digests of some follow, while others in their entirety will be published in later issues of Rock Products.

President's Address

In opening the convention and summing up the activities of the past year, President Zander said in part:

"The United States government has been preparing a specification which when finally adopted will be mandatory for use on all United States government work. The tentative specification submitted to the association puts sand-lime commons on the same basis as clay common. Your committee C-3, A. S. T. M., who will make a report later, have, as usual, been on the job and their work is of immense value to you. There has been a constant interchange of correspondence between your officers and the officers of other associations, some of a pleasant nature and some not so pleasant, as was the complaint made to the Federal Trade Commission concerning an article in the Dow service under date of May 24, 1924. Another matter that has occupied the time of several members and the officers of the association has been the matter of discrimination in freight rates now in effect between sand-lime commons and clay commons. Fortunately, many of our members deliver a large part of their output locally so that this discrimination is not felt so severely.

Recommendations for the Future

"There has been much work done at various local points during the past year in such things as local building codes and assistance in making large sales and as usual members called on to help have given freely of their time and knowledge.

"Let me make my recommendation for the immediate future. Continue the policy of mutual benefit upon which this association was founded. Send in the names of manufacturers whom you know are not members and, if possible, communicate and help to get their names on the association register. Write your officers promptly on events of vital interest to this industry."

The next paper was by Robert Kennedy of the Canada Sand-Lime Pressed Brick Co. on the "Early History of Sand-Lime Brick in Toronto." This recalled the difficulties encountered in the early days and that these were overcome and overcome successfully is recalled by the fact that there are now seven plants operating in Toronto with a total output of over 325,000 brick daily.

Sand-Lime Brick for Sewer Work

"The Use of Sand-Lime Brick for Sewer Work" was a paper delivered by G. W. Phelps of the Flint Sandstone Brick Co. Mr. Phelps pointed out the progress made by the city of Flint in the construction of sewers and how sand-lime brick entered into the construction. A letter was read from H. C. McClure, city engineer of Flint, in which he stated that sand-lime brick for the construction of manholes and catch basins had proved to be entirely satisfactory, economical and serviceable. During 1924 the city of Flint used 1,100,000 brick for this purpose.

"A very interesting paper on "The Strength of Brick Work Pertaining to Building" was delivered by W. W. Pearse, business administrator, board of education, Toronto. An outline of the history of brick was first given and then some tests conducted by Toronto University. Brick piers were laid up and held for three months before tests began. The piers were 9 in. square, built 9 ft., 6 ft., and 4 ft. high. It was proven that brick laid in lime mortar were not as strong in compression as those laid in cement mortar. Also, that sand-lime brick compared more than favorably with clay brick.

Making 22,000,000 Brick on One Press in One Year

The paper delivered by J. G. Schluchter of the Rochester Sand and Brick Co. on "Producing Eighteen Million Brick on One Press During 1924" excited considerable comment. It seemed hardly possible to accomplish this feat, but nevertheless it was done, and, according to Mr. Schluchter, it was directly due to the splendid way in which his organization functioned. For 1925 they have set their goal at 22,000,000 brick on the one press.

J. M. Porter, Bureau of Standards, read

a paper on the "Compressive Strength of Sand-Lime Brick Walls," written by H. L. Wittemore and A. H. Stang of that department. An abstract of this paper will appear in a near issue of ROCK PRODUCTS.

In the discussion of adopting a standard sized brick (2¼x3¾x8 in.) the association voted to get its machinery in order as soon as possible. A period of six months was set as a reasonable limit. This is in accordance with the work of the Department of Commerce in simplification.

On the afternoon of the first day the association visited the plants of the Toronto Brick Co. and the Harbour Brick Co.

Registration

The following were registered as attending:

J. M. Porter, Bureau of Standards, Washington, D. C.
J. Morely Zander, Saginaw Brick Co., Saginaw, Mich.
John L. Jackson, North Indiana Brick Co., Michigan City, Ind.
J. W. Van Brunt, Jackson and Church Co., Saginaw, Mich.
J. Finkbeiner, Michigan Pressed Brick Co., Detroit, Mich.
J. C. Taylor, Sand-Lime Products Co., Detroit, Mich.
D. E. Boice and E. C. Boice, Pontiac Brick Co., Pontiac, Mich.
J. G. Schluchter, Rochester Sand and Brick Co., Detroit, Mich.
Allan G. Walton, Hummelstown-Brownstone Co., Hummelstown, Penn.
W. H. Crume and R. C. Kiser, The Crume Brick Co., Dayton, Mich.
H. W. Terry, H. D. Robertson and C. J. Stalker, Harbour Brick Co., Toronto, Ont.
J. J. Gallagher, F. E. Gallagher and Wm. H. Weafer, Winchester Brick Co., Winchester, Mass.
G. W. Phelps, Flint Sandstone Brick Co., Flint, Mich.
R. E. Boomer, Michigan Builders and Supply Co., Detroit, Mich.
G. H. Nichols, The Grande Brick Co., Grand Rapids, Mich.
H. G. Speth, Rochester Composite Brick Co., Rochester, N. Y.
Otto Schwartz, American Brick Co., New Orleans, La.
C. H. Carmichael, American Brick Co., Boston, Mass.
W. A. Smyth, York Sandstone Brick Co., Toronto, Ont.
Dr. A. S. Wolfe, National Brick Co., Washington, D. C.
Jas. Hindle, Hindle Bros., Toronto, Ont.
C. R. Christie, Canada Lime Co., Toronto, Ont.
L. Hossenlop, Buffalo Sandstone Brick Co., Buffalo, N. Y.
W. F. Swan and N. S. Myers, Menominee Brick Co., Menominee, Mich.
W. D. Macfarlane, Winnipeg Brick Co., Winnipeg, Can.
I. G. Toepfer and C. W. Wendt, Acme Brick Co., Milwaukee, Wis.
F. E. Waterman, Toronto Brick Co., Toronto, Ont.
J. P. Russell, Contract Record, Toronto, Ont.
Robt. Kennedy and W. A. Kennedy, Canada Sand-Lime Pressed Brick Co., Toronto, Ont.
R. C. Bustard, Caledon Brick Co., Toronto, Ont.
L. Haigh, Hadfield-Penfield Steel Co., Bucyrus, Ohio.
H. R. Caldwell, Department of Commerce, Washington, D. C.
H. Langan, International Lions Club, Chicago, Ill.
D. M. Gray and Wm. Irwin, Jr., Louisville Cement Co., Louisville, Ky.
F. T. Musgrove, Alleghany Slag Products Co., Buena Vista, Va.
C. E. C. Dyson and C. H. Stanton, Board of Education, Toronto, Ont.
W. W. Pearse, Business Administrator, Board of Education, Toronto, Ont.
J. A. Harris, Toronto Hydro-Electric Co., Toronto, Ont.
Charles A. Breskin, Rock Products, Chicago, Ill.

Slate Production in 1924

THE value of the slate sold at the quarries in 1924 was $11,816,000, according to estimates made by producers to the Department of the Interior, through the Geological Survey. This value was 2% less than that reported for 1923.

The output of all slate products except slate sold for vaults and covers and for roofing granules was less in 1924 than in 1923. The average unit value of these products except vaults and covers and roofing granules increased somewhat in 1924. The quantity of roofing slate sold was 479,000 squares, valued at $4,760,000, a decrease of nearly 6% in quantity but an increase of 4% in value. The average value per square increased from $9.03 in 1923 to $9.94 in 1924. The total sales of mill stock amounted to 10,130,000 square feet, valued at $3,940,000, a decrease of about 9% in quantity. Roofing slate was in good demand in most districts and the decrease in sales was due chiefly to a strike that started in May in quarries in Pennsylvania. This strike had its influence on other slate products as well as on roofing slate. The demand for electrical slate was good during the first part of the year but fell off considerably near its end. The demand for structural and sanitary slate was also good during the first nine months of the year according to some producers, although others report poor demand and only fair sales for the entire year. Slate for blackboards and bulletin boards was in good demand throughout the year but could not be supplied on account of the strike in the quarries. The output of school slates, most of which are exported, decreased because of the scarcity and cost of the raw material. The output of crushed slate for roofing granules was estimated at 492,000 tons, valued at $3,070,000, an increase of 6% in quantity during 1924 but a decrease in average value per ton from $7.07 in 1923 to $6.24 in 1924

The accompanying table shows the estimated sales of slate by the quarrymen in 1924, by uses and the sales in 1923 for comparison.

ROOFING SLATE, MILL STOCK,* AND SLATE GRANULES SOLD IN THE UNITED STATES IN 1923 AND 1924, BY USES.

Use	1923 Quantity	1923 Value† Total	1923 Value† Average	1924 (Estimated) Quantity	1924 (Estimated) Value† Total	1924 (Estimated) Value† Average
Roofing, squares	507,587	$ 4,582,535	$ 9.03	479,000	$ 4,761,000	$ 9.94
Approximate equivalent in short tons	171,300	.....	.....	162,000	.....	.....
Electrical, square feet	2,182,890	1,754,717	.80	1,938,000	1,594,000	.82
Approximate equivalent in short tons	15,600	.....	.....	14,000	.....	.....
Structural and sanitary, square feet	2,479,620	894,757	.36	2,313,000	855,000	.37
Approximate equivalent in short tons	17,730	.....	.....	16,500	.....	.....
Grave vaults and covers, square feet	451,160	111,223	.25	474,000	120,000	.25
Approximate equivalent in short tons	6,450	.....	.....	6,800	.....	.....
Blackboards and bulletin boards, square feet	4,415,710	1,186,864	.27	4,107,000	1,150,000	.28
Approximate equivalent in short tons	31,600	.....	.....	29,400	.....	.....
Billiard-table tops, square feet	527,680	180,981	.34	478,000	200,000	.42
Approximate equivalent in short tons	3,770	.....	.....	3,400	.....	.....
School slates, pieces	2,144,900	31,102	‡14.50	1,673,000	26,000	‡15.54
Approximate equivalent in square feet	1,052,420	.....	.....	820,000	.....	.....
Approximate equivalent in short tons	1,550	.....	.....	1,200	.....	.....
Granules, short tons	462,260	3,268,554	7.07	492,000	3,070,000	6.24
Other§ short tons (estimated)	16,540	65,891	.....	2,000	40,000	.....
Total (quantities approximate, in short tons)	726,800	12,076,624	.....	727,300	11,816,000	.....

*In 1923 the mill stock sold, including school slates, was 11,109,480 square feet, valued at $4,159,644; in 1924, 10,130,000 square feet, valued at $3,940,000.
†F. o. b. at point of shipment.
‡Average value per thousand pieces.
§Includes slate sold for flagging (249,540 square feet, valued at $54,493, in 1923, and 140,000 square feet, valued at $40,000 in 1924), tombstones, waste slate, and other uses not specified.

Sand and Gravel in Louisiana

THE consumption of sand and gravel in the state of Louisiana has been one of steady development for the past 20 years, according to Dr. Henry V. Howe, state geologist of Louisiana. Louisiana produces building sand, grinding sand, fire or furnace sand, engine sand, paving sand, building gravel, paving gravel, and railroad ballast.

Down to 1914 the production varied from year to year, says Dr. Howe, averaging about 750,000 tons, valued at from $250,000 to $448,000 per year. Since 1914, the production and value of sand and gravel has steadily increased. This has been augmented since the World War by the construction of an elaborate system of state highways requiring great quantities of gravel.

The production of sand and gravel in 1921 amounted to 1,821,695 tons, valued at $1,491,406. The production for the past 20 years has been in excess of 25,000,000 tons, the geologist asserted, valued at slightly over $10,000,000.—*Baton Rouge (La.) Times.*

Gypsum Preparation and Manufacture From Mine to Wall Board

Plant Erected by Beaver Products Company, American Cement Plaster Division, Ft. Dodge, Iowa, Typifies Progress Made in Industry

By Charles A. Breskin

THERE are two types of gypsum board on the market today—plaster board and wall board. Each of these is purely an American product. Plaster board was developed first, and along about 1914 gypsum wall board was perfected to meet the demand for a substantial ready made wall that could be put in place by very simple methods.

The satisfactory showing made by gypsum wall boards on buildings constructed for war purposes during 1917-1918 greatly stimulated this phase of the gypsum industry. It was and still is the only form of wall board on the market that has fire-resisting qualities. This was soon recognized by underwriters and the demand for the product grew until today it has assumed huge proportions. With this growth has come a steady development in the manufacture of the product itself. Hand operation has given way to automatic machinery and all the uncertainties are things of the past.

The new wall board plant of the American Cement Plaster Division, Beaver Products Co., Inc., is located at "Gypsum," three miles southeast of Fort Dodge, Iowa. It has been in operation now about three months and is producing wall board at the rate of 150,000 sq. ft. per 24 hour day. All of the operating difficulties that presented themselves at the start of the operation have been ironed out and the plant is now functioning with an unusual smoothness.

Before entering into a detailed description of the wall board plant, there will be described briefly the method of mining gypsum at this plant, its various stages of reduction and refinement until stucco is produced.

Mining, Crushing, and Storage

As is common with other plants in the Ft. Dodge district, the "room and pillar" method of mining is used. The bed of gypsum runs 12 to 15 ft. thick and is reached at a shaft depth of 65 ft. Sufficient rooms and entries have been opened up in the mine to provide the mill from 800 to 1,000 tons of gypsum rock daily.

The rock is drilled with electric auger drills and the holes are then loaded with dynamite, either gelatine or plain. Shots are made so that the rock is shattered without producing excessive fines. It is then loaded by hand into 2½-ton cars, 34-in. gage. Men who do the loading are paid on a tonnage basis. Cars are collected from the rooms and brought to the main haulageway where a 6-ton Goodman electric locomotive delivers them to the foot of the shaft.

In the shaft are two automatic, self-dumping cages upon which the loaded cars are placed. An Ottumwa electric hoist lifts the loaded car up through a distance of 70 ft. and dumps it into a suspended scale hopper. Here the weight of the rock is recorded on an automatic Fairbanks dial scale and it is then dumped into the crusher hopper. As a loaded car goes up an empty car goes down, making the operation a continuous one. One operator, located in a cage just above the crusher, takes care of the hoisting, weighing, recording and dumping, as well as tending to the crusher.

The primary crusher is of the rotary type with a capacity of 125 tons per hour. The rock is reduced anywhere from 1½ to 3½-in. depending upon size required, and discharged to an elevator and belt conveyor which delivers either to a rock storage bin or to a cross conveyor delivering to an outside rock storage. The cross conveyor is 18 in. wide and 900 ft. long and runs on a trestle, underneath which can be stored over 30,000 tons of rock. The bin storage has a capacity of 500 tons.

View showing block plant, gypsum rock storage, and outside storage for gypsum block

Located in a long underground tunnel directly underneath the rock bin and outside storage are two sections of belt conveyor. One is 18 in. wide by 870 ft. long, extending under the outside rock storage. The other is 20 in. wide by 197 ft. centers, extending under the rock bin and at the discharge end rising 10 ft. above floor level. These two conveyors are run independent of each other. When rock is taken from bin storage, the conveyor reclaiming from outside storage is down. When reclaiming from outside storage, both conveyors run.

Drying, Grinding, and Calcining

The belt conveyor underneath the rock bin discharges over a Dings' magnetic pulley into a hopper feeding a 6x42 ft. sin-

gle shell Vulcan dryer. This dryer is direct fired, coke being used for fuel. It has no pitch but is fitted inside with lifting and conveying flights. The capacity of this unit is 50 tons per hour.

In connection with the dryer is an exhaust fan which not only draws the air from the fire box but also all of the fine dust created during crushing and drying. This dust is drawn through a duct and discharged into a long narrow chamber, which acts as a dust collector. The dust chamber is fitted with a series of baffle walls over and under which the dust-laden air is carried. The area of the cross-section of this chamber is greater than the area of the cross-section of the dryer itself, and thus the velocity of the gases drawn through is reduced, allowing the dust to deposit on the bottom. A screw conveyor for the continual removal of dust is placed at the bottom of the chamber, so that the capacity of chamber remains approximately constant.

The rock from the dryer and dust from the chamber are discharged into a 36-in. by 42-in. Jeffery hammer mill. This serves as a secondary crusher and a preliminary grinder, and the total output will pass a ½-in. ring. The discharge from the hammer mill is reclaimed by a bucket elevator which brings the dry rock to a Hummer electric vibrating screen. Here three separations are made, some of the rock being shipped to portland cement plants or for land plaster, but the bulk going to the bins over the grinding machinery.

There are two grinding units of the roller-mill type. The material is ground to the consistency of a palpable powder and is discharged into a screw conveyor and elevator which discharge to an Emerick air separator. The fine material is delivered to the bins over the calcining kettles while the coarse returns to the grinding machines.

Over each calcining kettle (there are three) is a parabolic bin of 40 tons capacity. The pulverized gypsum rock is fed direct into the kettles, which are 10x10 ft. These kettles set on concrete foundations instead of brick, making a very neat appearing job and each is equipped with a Tyco indicating and recording thermometer. When a temperature of 330° F. has been reached the gypsum is discharged into a hot pit below the kettle. From here it is conveyed to a "stucco" elevator which can discharge to either of three departments—the plaster mill, block mill or wall board mill.

Room and Pillar method of mining is used. Electric auger drills are used for drilling and car loading is by hand. Men are paid on a tonnage basis

The stucco for the plaster mill is delivered to parabolic bins underneath of which is located one 3-valve Bates packer and two Broughton mixers and open-mouth packers. Here the various plasters are prepared such as hair fibre, wood fibre, finishes and composition mixture for various systems of gypsum roofing, etc. On the ground floor of this building is an extra large bag warehouse. A freight elevator is used to bring bags, hair and wood fibre to the second floor for mixing.

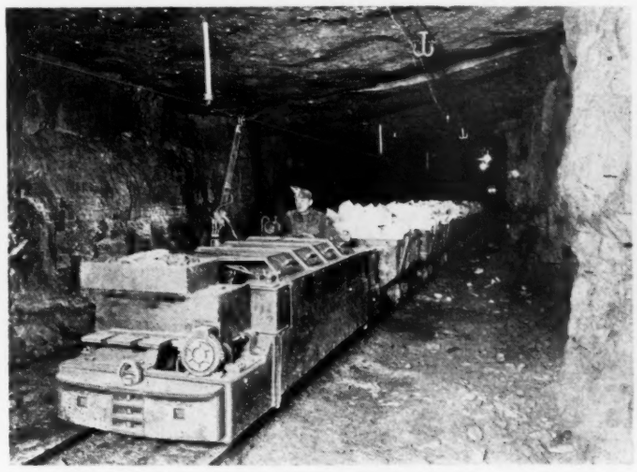
Gypsum wall-board is defined as being an uncombustible material for interior walls, ceilings and partitions consisting of two layers of fibrous materials on the outside of a core of gypsum. The board does not shrink, expand, warp or buckle. It can be decorated in the same way that other boards are treated. Thus only two raw materials are really necessary, stucco and fibre or paper, although sawdust and an accelerator to hasten the set of the gypsum core are added in the process.

Stucco is delivered to the board plant by a screw conveyor from the stucco mill. This discharges to a steel bin of 300 tons capacity. Sawdust is delivered in box cars on a track adjoining the board plant. It is shoveled out by hand into a chute feeding a small elevator which discharges into a small conical screen. Here all foreign and objectionable matter is removed (bark, tailings, etc.), while the fines which go through the screen are picked up by a suction fan and discharged up a pipe into a cyclone dust collector, located on top of a steel sawdust bin. The collector discharges to the bin which has a capacity of 40 tons.

Underneath the sawdust and stucco bins are drag chains located in dust-tight steel boxes. These run in opposite directions so that the materials fed to the drag chains are discharged to one common hopper. Over the drag chain delivering stucco is a small hopper through which an accelerator is added to the mixture so as to hasten the set.

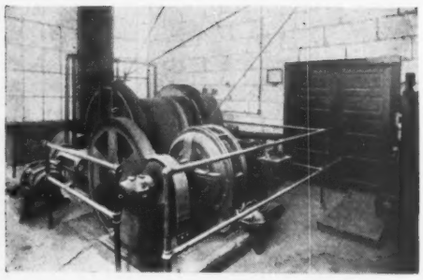
The mixture from the hopper is reclaimed by a bucket elevator which feeds into a small screw conveyor and this in turn discharges onto the mixing belt proper. The small conveyor is merely to insure a regular and even flow of material to the mixing belt.

The mixing belt is a Goodyear, 48-in. wide and 20-ft. centers, and runs in a water bath, there being a steel pan underneath. As the mixture is discharged to it from the feed conveyor it is spread by a



A 6-ton electric locomotive delivers all cars in the main haulageway to the foot of the shaft. The system is the same as that employed by street railways

The mine headhouse, crusher, gypsum rock storage bin, and beginning of outside storage. The building to the right houses the hoist, air compressor, and generating equipment

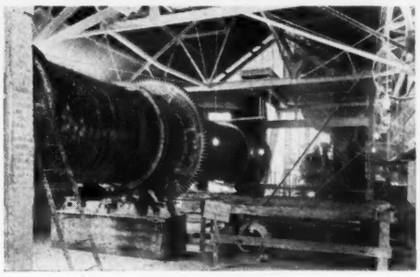


Hoist used for operation of self-dumping cages. It was formerly steam operated but was changed over for electric operation, being connected to a 100-hp. motor, and is fitted with solenoid brakes

saw tooth arrangement. Three feet from the discharge end of this belt are located 10 agitators, and as the material passes through these it is sufficiently agitated to insure a uniform mix. The agitators are shaped like egg beaters and just barely touch the belt. The mixing belt and agitators are driven from one motor through a Foote spur gear reducer. The discharge from the mixing belt goes direct to the board machine's feed belt, which is at right angles to the mixing belt.

Wall-Board Plant

The paper or fibre comes from the Beaver Products Co.'s own mill at Thorald, Ontario, Canada. It is delivered in box cars on a track siding adjoining the paper storage house. The cars are unloaded by hand as far as the door of the building and from here it is handled by a three-ton Northern overhead electric traveling crane. The building for paper storage is 24x120 ft. and will accommodate over 400 tons of paper.

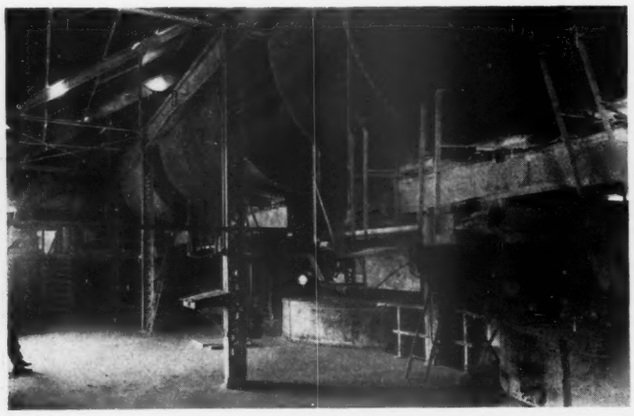


The dryer is a single shell, direct fired, 6x42 ft. Coke is used for fuel. Note dust pipe over the discharge end for drawng out dust-laden air

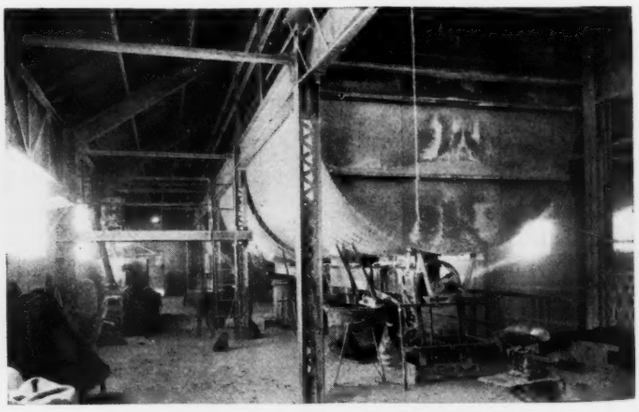
Each roll of paper weighs approximately 1,600 lbs. and comes in four sizes, being used in combinations. With paper 46½ in. for the back, a 51-in. face paper is used; with 31½-in. for the back, a 35-in. face. The paper is carried from storage to the paper racks of the board machine by the same hoist that puts it in storage. Back paper is put on the top of machine and face on bottom, the board being made face down. An arrangement is provided whereby all the paper is put in place by one man. He passes new paper over the old and into folders and after the tension is correct he slides the old roll out and the new one into place without interfering with the process.

The Board Machine

The face paper runs through guides and then under scoring wheels, indicating where the edges will be turned. At this point the mixing belt discharges onto the paper and it reaches the squeeze roll. Just ahead of the roll is an oscillating arm which moves agitators over the width of the face paper and spreads stucco uniformly over it. Also, at this point the top or back paper comes in contact with the stucco, having come through an arc of 180 deg. from a platform overhead. The squeeze roll is ordinarily set to give the board a thickness of ⅜ in., but, if necessary, this can be adjusted to any size.

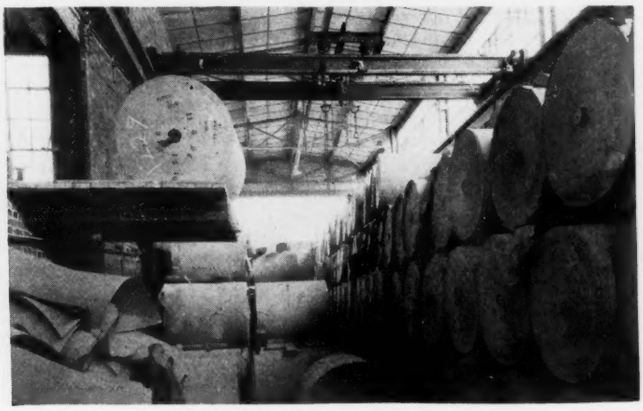


Top of calcining kettles and parabolic bins overhead containing pulverized gypsum. Each kettle is fitted with an indicating and recording thermometer

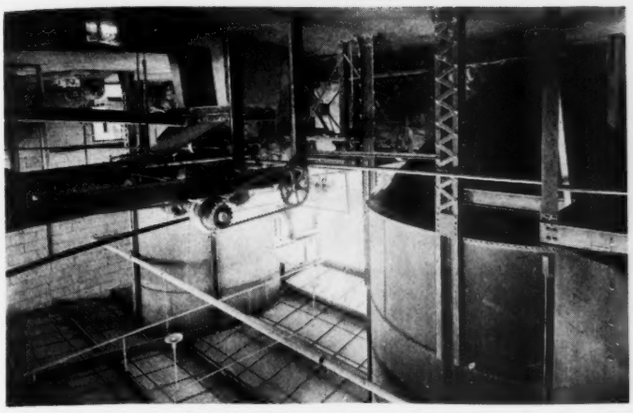


Bins and weigh hoppers overhead packing machines. Note hair shredder at extreme left. The bins are sheet steel and also of the parabolic type

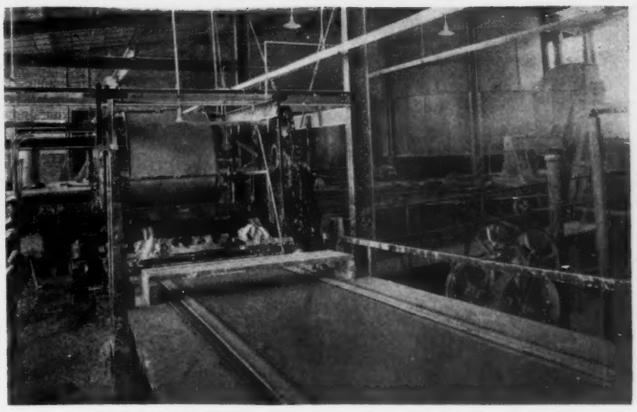
The stucco warehouse. The elevator in the center delivers hair, wood fiber, and other materials to the second floor or mixing and weigh hoppers, from which they are fed to the machines below



The paper warehouse. A three-ton electric crane is used for handling. The roll of paper on the platform is the back paper and runs on a platform overhead the board machine until it reaches the squeeze rolls



In the foreground, left, is the 40-ton sawdust bin. In the background is the 300-ton stucco bin, and in the center the elevator delivering mixture to the mixing belt, a portion of which is shown here



The "green" board with the edges of the paper folded over passing to the ironing rolls. The roll and knife in front scrape off the excess plaster from the board

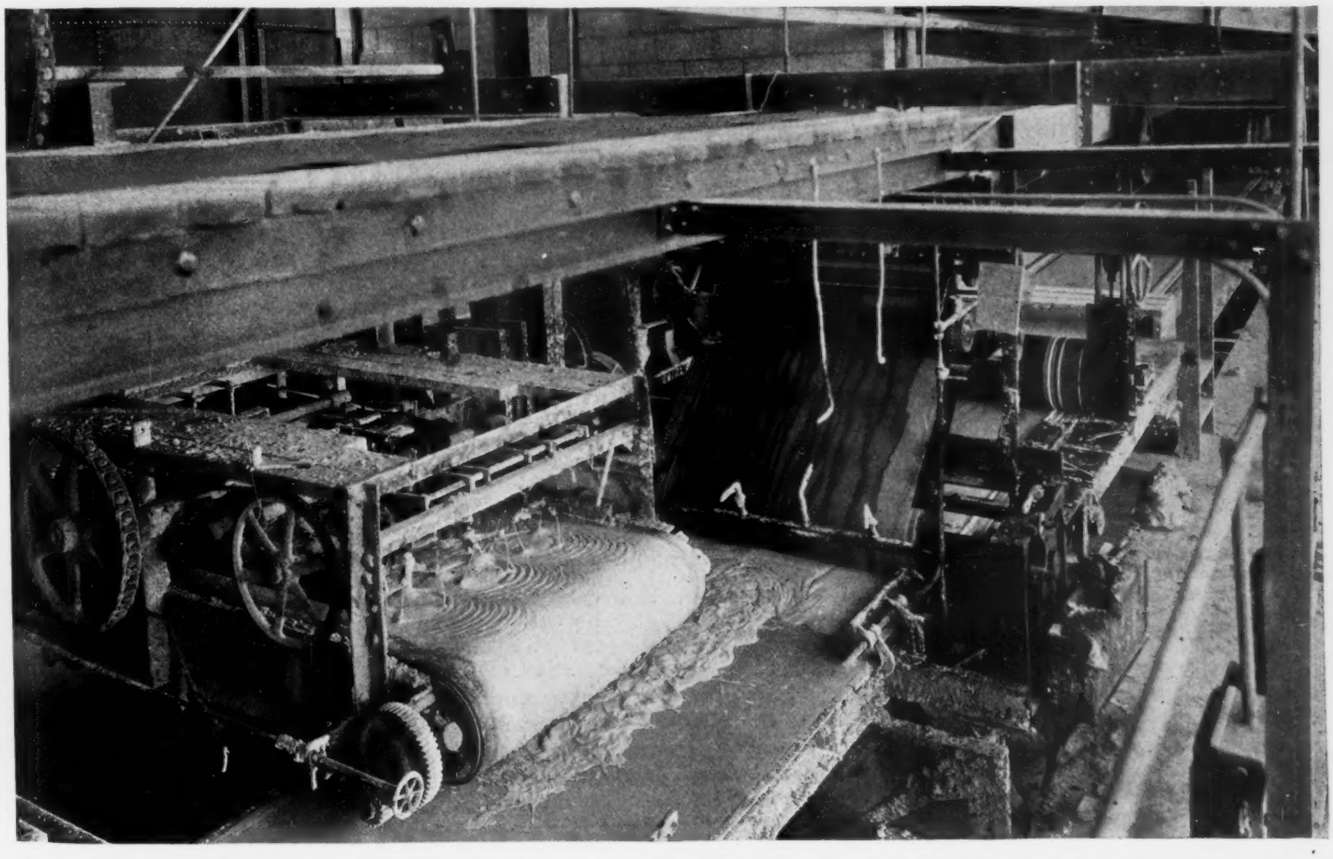
After leaving the roll the "green" board passes under folders where the edges are turned. The folders can be set to make either 32-in. or 48-in. board. The "green" board then passes onto a belt conveyor, 53 in. wide, 55 ft. centers, which extends just beyond the ironing belt, and under which the board passes. The ironing belt is merely an endless belt over the main conveyor and is weighted down. It presses the board to exact size and smoothness.

After leaving the ironing rolls the board is still soft and is ready for travel to the cutter. It passes onto another conveyor 53 in. wide, 155 ft. centers, which brings it to the cut-off saw.

It should be mentioned here that a satisfactory bond between paper and gypsum matrix is greatly essential. While the gypsum core or matrix is settling there is an actual growth of gypsum crystals within the fibre of the paper, due to the penetration of the paper by water saturated with gypsum. By the time the board reaches the saw the gypsum has received its initial set.

The plane of the cut-off saw is perpendicular to the line of the board but advances at such an angle that it moves forward just as fast as the board, thereby cutting the board off squarely and to exact length. The boards are cut from 6 to 10 ft. in length, depending upon size required. A label is pasted on by an attendant and the board is discharged to a set of gravity rolls which feed the transfer.

All three conveyors which carry the



Discharge from mixing belt onto face paper of board. Note egg-shaped agitators at discharge end. The mixture is just coming to the squeeze roll where it meets the face paper. After leaving roll, the edges are turned over and the "green" board is on its way to the ironing rolls. Note "distributor" at feed roll and precautions taken to safeguard men from hazardous machinery

board, the ironing belt and the cut-off saw are driven from a 20 h.p. variable speed motor through chains and sprockets, as well as rope drives.

The Transfer and Elevator

These two pieces of equipment are of the company's own design and for which patents are being applied for. They serve to place the board two abreast and then to put them on any of the decks of the dryer, as desired. The transfer is equipped with driven rolls driving with the travel of the board and also driven rolls driving at right angles to the travel of the board. The operation is as follows: The board is received on the transfer the desired distance. The operation of a lever raises the cross rolls and a clutch thrown in at the same time drives them, bringing the board to the far side of transfer. The second board comes abreast of the first one and then both are driven on to the hydraulic elevator. Thus, it is only necessary to raise every other board.

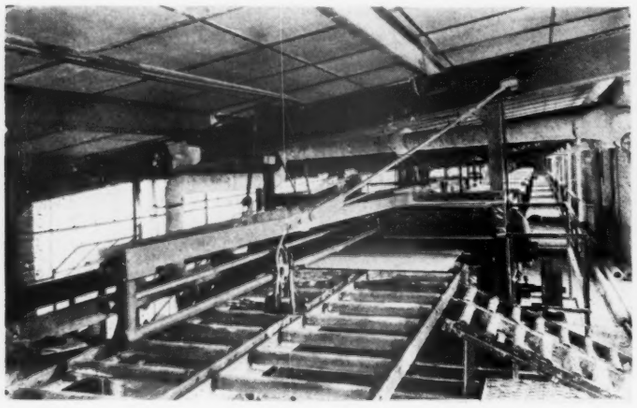
The hydraulic elevator is operated by the same man operating the transfer. A series of cams or dogs on the dryer feeding mechanism cause the elevator to stop at any deck of the dryer. The operation is as follows: Board is put on elevator. It is then lowered to the first deck of the dryer where it engages a cam that throws in a clutch operating driven rolls of the elevator bringing board directly to the kiln. It then goes back to the top and automatically sets a stop for the second deck. In this manner all decks of the dryer are filled. At the entrance of the dryer on each deck the first set of rolls are driven, allowing the boards to run in at a relatively high speed until it gets to the dryer rolls.

In connection with the hydraulic elevator is a pump and accumulator. The pump compresses water into the accumulator raising it to the highest point and then automatically stops. When it is desired to raise the elevator a valve is released, causing the accumulator to go down and the elevator up. Immediately the pump starts storing power in the accumulator again. The elevator descends of its own weight. This equipment was built by Chas. F. Elms Co., Chicago, Ill.

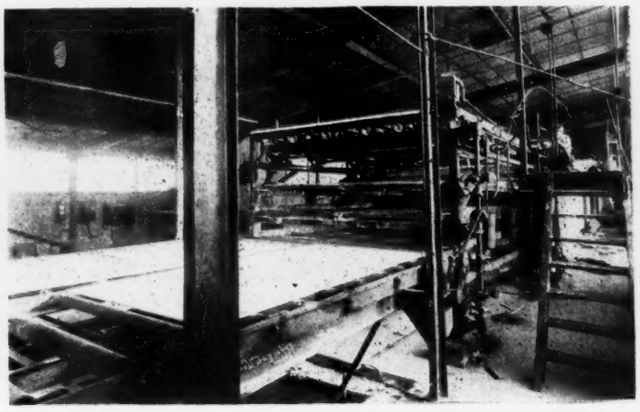
The Dryer

The dryer is the product of the Coe Manufacturing Co., Painesville, Ohio. When originally purchased it was 200 ft. in length, being designed for a capacity of 100,000 sq. ft. At the time the wallboard plant was started it was desired to increase the capacity to 150,000 sq. ft. and so the length of the dryer was increased to 270 ft. and a 50 ft. cooling section was added, making the over-all length 320 ft.

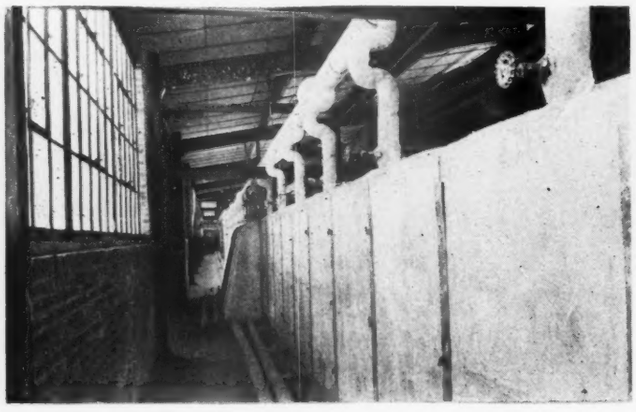
The dryer consists of a long enclosed insulated box or compartment heated with steam coils, the board being passed through continuously over driven rollers and the moisture being removed by a suitable fan system. This particular dryer has four layers, or decks of rolls. The rolls are equipped with gudgeons on the end which revolve in specially developed ball bearings, requiring practically no lubrication and very little power. The speed of the rolls is controlled by a Coe train of gear reducers connected to a small vertical steam engine.



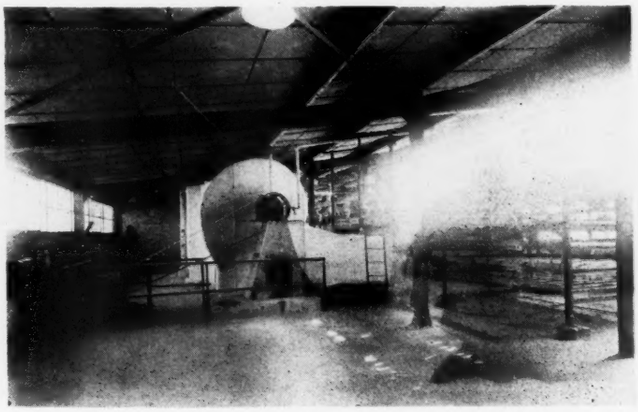
The board has now reached its initial set and has approached the cut-off saw. As soon as the end strikes the stop shown in foreground the board is cut and rolled to the transfer table. Underneath the conveyor shown here is located the dryer



The transfer, hydraulic elevator, and entrance to dryer. In this view the board is shown entering third deck of dryer. Note dogs or cams for regulating stop of elevator on side of entrance to dryer. One operator does all the work



View of the dryer itself. It is 270 ft. long and has a 50-ft. cooling section. The ducts shown in the center by-pass air from the supply fans to a passage underneath the dryer returning to the blower. Note how well dryer is insulated



One of the 50,000 cu. ft. of air per minute blowers. The preheat section is on the other end. To right is entrance of dryer. The hot air circulates and a portion is continually removed to prevent saturation

The dryer was designed to evaporate 8/10 lb. water per square foot of board and with this amount of water present to dry 150,000 sq. ft. of board in 24 hours. However, 8,000 sq. ft. of board have already been run through the dryer in one hour, indicating that the design is somewhat liberal.

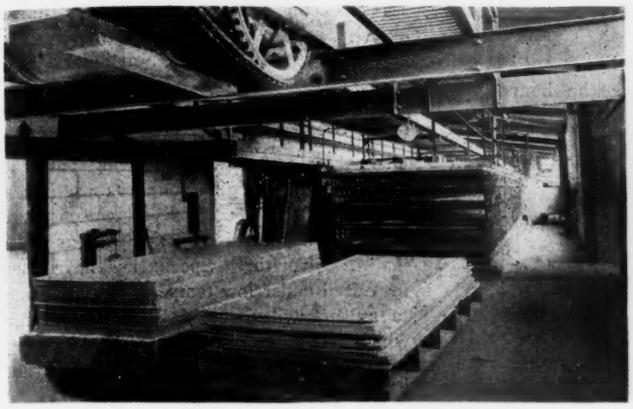
There are 51 banks of coils in the dryer of 1¼-in. pipe. These are located between each set of rollers, and on top and underneath the first and last deck. Over 50,000 ft. of pipe is used in the heating coils alone and approximately 400 boiler horse power is required to operate the dryer. A 5-in. line furnishes the steam from the power house, 105 ft. away. This line is well lagged to prevent excessive radiation.

The banks of coils are divided into three sections, each operating at a different temperature, and each draining into a common return pipe for its section and then to a tank. In connection with the tank is an S-C regulator and air relief valve. When the water collects to a predetermined height, the regulator is cooled and the diaphragm then is relieved of the pressure, allowing the valve in the return line to open. The pressure in the first section (125 lb. per square inch) forces the condensate over to the power house where it is sent back either to the boiler or feed water heater. The steam then goes to the second section of coils at a pressure of 115 lb. per square inch. In the drain system of the section another regulator is placed. Here the steam is sent to the third section at a 105 lb. pressure, the condensate being returned, as before, to the power house. In the last section condensate is returned and the steam passes into a bank of condensing coil. This condenses the remaining steam and induces a greater circulation through the other coils. Thus, practically all of the water of condensation is returned to the boilers, requiring comparatively little make up water and making for a very efficient system of drying.

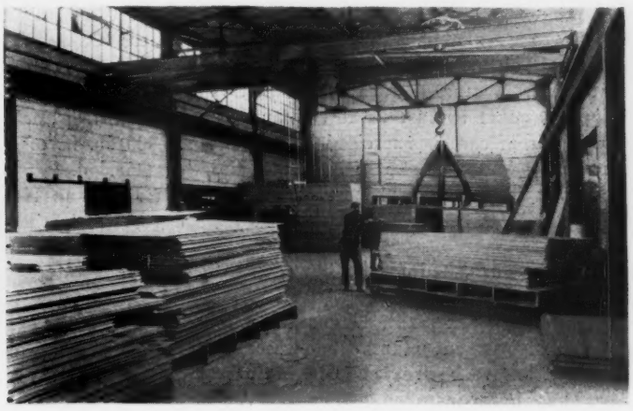
Tyco recording thermometers have been installed on each section of the dryer, which provides for a very accurate control. The dryer itself is very well insulated and heat loss by radiation is kept down to a minimum.

Air Circulation

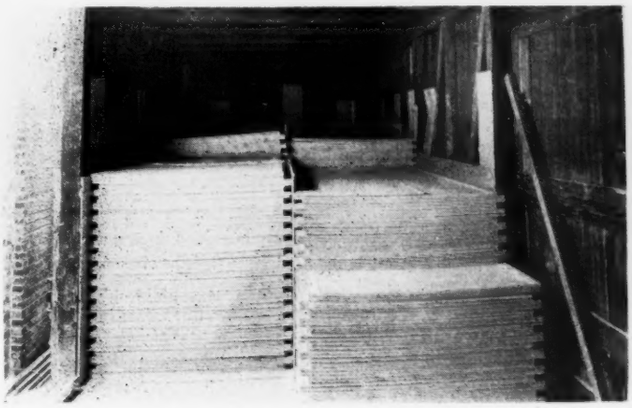
The air circulating system in the dryer is the latest design of the Coe Manufacturing Co. Two 50,000 cu. ft. per min. Bayley fans force the air through special nozzles which are placed between the several decks of rolls. One fan is at the wet end of the dryer and one at the dry, each forcing the air towards the center of the dryer. The air passes over the board, and at the center in a return duct and down through a passage under the dryer and back to the blowers. In order to prevent the return air from getting saturated and losing its drying properties, a 30,000 cu. ft. per min. Bayley exhaust fan has been placed between the two supply fans. The exhaust fan removes about 15 per cent of the air from each of the blowers, making it necessary for each blower to supply "make-up air" at either end of the dryer. Also, in the return duct of the blower at the wet end is placed reheat coils that serve to reheat



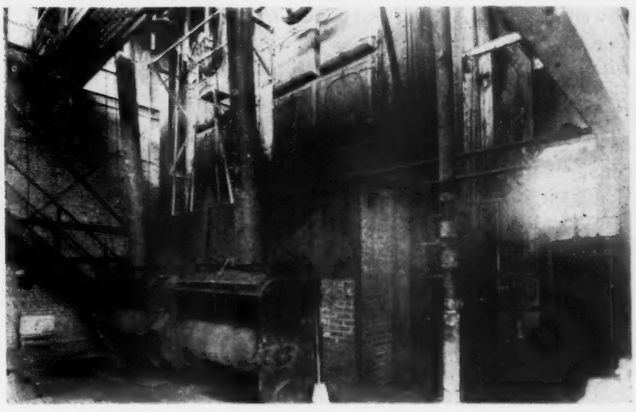
Discharge end of dryer. On right is supply duct of one of the blowers. At left is vertical steam engine and train of gear reducers driving rolls of dryer. The finished board is placed on pallets which are removed by jack lift trucks to the warehouse



A section of the warehouse, in which can be stored a half million square feet of wall board. The five-ton overhead electric traveling crane, with special cradle, lifts pallets with board and distributes in warehouse. In the foreground is shown a pallet with board ready to be raised



Wall board packed in box car ready for shipment. Note great care exercised in loading



The boilers and automatic chain grate stokers in power house

the circulated air.

As the boards come off the dry end of the kiln they are handled by two men who inspect them thoroughly and then place them on a specially constructed wooden pallet. As soon as a pallet is full it is hauled to the warehouse by a jack lift truck and placed near one of the loading doors. Otherwise a 5-ton Northern overhead electric traveling crane with a specially designed cradle distributes to storage. The warehouse is 38x120 ft. and will store over a half million square ft. of board, although there is never quite that much in storage for the product is shipped almost as fast as it is manufactured. Great care is exercised in loading. The method used is shown in one of the accompanying photographs.

Power Plant

Water is furnished to the power plant from two American deep well pumps located in the board plant. As is the case with most gypsum plants the water is hard and has to be treated. In this case there has been installed a Scaife "We-Fu-Go" water softening system.

Water is received in a 16,000 gal. reaction tank where it is treated with lime and soda-ash. It is then filtered and discharged to a clear well. From here it is pumped out by a 4-in. Terry centrifugal pump, turbine operated, and delivered to two B & W standard type water-tube boilers, 300 hp. each. The boilers are equipped with LaClede-Christy chain grate automatic stokes.

Coal is received in hopper bottom cars and dumped into a track hopper at the power house. A short apron conveyor delivers the coal to a bucket elevator which carries it to the top of the building, discharging into one of two 30-ton hoppers feeding the stokers. If the bins are full the coal can be by-passed to a screw conveyor feeding an 18-in., 80-ft. centers, Goodyear belt conveyor on a high trestle. The coal is dumped underneath the trestle, which will store over 1,500 tons of coal. A tunnel and belt conveyor underneath the storage reclaims the coal depositing to the main bucket elevator feeding the stoker bins.

Ash and clinker is taken from the boilers with a drag chain and delivered to a small bucket elevator discharging to a suspended steel ash bin about 7 ft. above ground level. Wagons and trucks are driven underneath the bin. Neither ash nor coal is touched by hand and only one attendant is required for the entire power house.

The board plant, paper warehouse, board warehouse and power plant have structural steel frame work, steel sash, concrete floors, gypsum roofing and brick walls, making it absolutely fireproof. All division walls are of the company's own gypsum block. Platforms are covered with Irving subway grating. Electric wiring is all in conduit and separate switchboards are provided for each department, thus making them independent of each other. All hazardous machinery is enclosed in a fine wire mesh.

The board plant is entirely electric driven, all motors being Westinghouse. Elevators, conveyors and drag chains are Link-Belt and all transmission machinery was furnished by the Dodge Co. Belting is all Goodyear and conveyor idlers and rollers, Caldwell.

Exclusive of the warehouse only 11 men are required to operate the board plant per shift. Each shift is 8 hours and 50,000 sq. ft. of board is produced during that period.

H. H. Van Hagan, with offices at Chicago, Ill., is the general manager of the American Cement Plaster Division, Beaver Products Co., Inc. G. C. Flynn is resident superintendent at Fort Dodge.

The Beaver Products Co., Inc., operates other gypsum mills at Akron, N, Y., Gypsum, O., Grand Rapids, Mich., Blue Rapids, Kan., and Agatite, Texas; roofing plants at Albany, N. Y., Chicago, Ill., and Kansas City, Mo.; a felt mill at Anderson, Ind.; paper mill at Thorold, Ont., Can.; Beaver Board Laminating Plants at Buffalo, N. Y., and Thorold, Ont.; paint and varnish plant at Buffalo, N. Y., and it controls timber preserves in Northern Ontario.

Thermal Expansion of Stone

POSSIBLY the day will come when concrete aggregate production will become so refined a process that limestone, or trap-rock, or some other aggregate will be valued more or less for certain properties that are now ignored. One such property is the thermal expansion of the stone. Possibly this property will eventually explain why some concrete cracks more than others. The U. S. Bureau of Standards is making tests of this property of thermal expansion and a progress report states:

"The determination of the thermal expansion of stone, i. e., the amount which the stone changes in dimensions with changes in temperature, has received very little attention in this country. Furthermore, an examination of the available data on the subject will reveal the fact that the few determinations which have been made are usually based on a very limited number of observations, and are rather misleading. The values most frequently cited in text books and hand books are based on coefficients obtained by measuring the length of specimens at normal temperature. The assumption has been made that the material expands at a uniform rate at all intermediate temperatures. Determinations at the Bureau of Standards, in which frequent length measurements were made on limestone and marble specimens as the temperature was raised, indicate that these old assumptions are far from correct. For small increases in temperature above the normal the expansion is very small, but the rate increases rapidly as the temperature rises. At 100 deg. C. the average expansion of marble is about the same as that of steel, but at 200 deg. C. the rate is approximately double, while for temperatures a few degrees above the normal the expansion is only a fractional part of that of steel. These peculiarities are of particular interest where stone is used in connection with other materials, as is usually the case in modern building construction.

Marble, especially, shows other peculiarities in its behavior under temperature changes. It expands on heating but when cooled to the original temperature it does not shrink to its original dimensions, i. e., it retains a part of the expansion as a permanent growth. Specimens have been measured under low temperatures and found to expand when cooled below the normal, which is also contrary to the usual conception. Such properties are probably the cause of the peculiar instances of warping which are sometimes noted in marble headstones in cemeteries.

Missouri Portland Cement Company Increases Capital

AN increase of $3,000,000 in the capital stock of the Missouri Portland Cement Co., raising the amount to $9,000,000, was voted at a special meeting of the stockholders of that organization. The increase represents in part $1,500,000 of surplus set apart by the stockholders for that purpose, according to H. L. Block, presiednt of the company.

At the same time, the corporation authorized a decrease in the par value of the stock from $100 to $25 a share, and an increase in the number of shares from 60,000 to 360,000. Four shares of the new stock will be issued in return for each share of the old. The rest will be held in the treasury.

According to Block, the action was taken that the company might be prepared for expansion, expected, though not exactly in contemplation. The $3,000,000 in treasury stock will be available in $25 shares for sale to the public if occasion arises in the course of business expansion, he explained. —*St. Louis Post-Dispatch.*

Illinois Purchased 4,500,000 Barrels of Cement for Road Building

THE Illinois Department of Public Works has announced the purchase of 4,500,000 bbl. of portland cement for use in the 1925 construction program.

Fifteen cement companies offered a total of 6,600,000 bbl., which is over 2,000,000 bbl. more than is needed immediately for the state's road program.

Editorial Comment

Concrete Products Aggregate

We fear the general impression exists that the manufacture of concrete products, or cement products, offers an easy way for sand, gravel, crushed stone and slag producers to get rid of waste, or surplus, materials. It is quite possible ROCK PRODUCTS has helped create such ideas, and if so, we hasten now to correct the impression; for no mineral aggregate producer should be allowed to believe that any old waste material about his plant, such as an excess of fine sand, can be profitably converted into building blocks or other concrete units, or that any aggregate may be used without careful study and preparation.

There seems to be no question in the minds of those best informed and best qualified to judge as to the direction in which the concrete products industry is heading. It is unquestionably the same as all successful and rapidly growing industries follow. It is toward large production, small unit profits and lowest possible costs consistent with a standard and uniform quality.

The character of the aggregate used is undoubtedly the most important variable factor, and it is by thorough-going study and preparation of the aggregate that the biggest economies are to be effected. Consequently, put it out of your mind that any waste product, as such, can be profitably made into concrete products, and prepare your plant to make a most carefully graded aggregate, if not for your own products plant, to fill the orders of other concrete products manufacturers who are rapidly acquiring a better knowledge of the relative values of various aggregates than the ordinary producer of them has at this writing.

Rock Products Have Unlimited Market

In his speech at the annual banquet of the National Crushed Stone Association, George Otis Smith, director of the Geological Survey, said that the increase in the use of rock products came from an increase in civilzation and not from an increase in population. In other words, the market for rock products is unlimited. Only so much food can be eaten, no matter how much is produced, so the market for food is limited by the number of people who can eat it. There is no such limitation on the use of cement, lime, gypsum, crushed stone, sand and gravel and like materials. As the country develops the materials of a cruder building period, such as timber and adobe, pass out of use and rock products come in. Better transportation is wanted and good roads and bridges are built. Then comes a demand for important public works and wharfs, docks and dams for big power and irrigation projects are undertaken. All this creates business, which calls for larger and better warehouses and other business buildings, and as wealth increases better residences are wanted. As an example of how the increase in the use of rock products is dependent on other things than population one might mention France, a country in which the population is slowly decreasing but which continually increases its use of rock products.

Quick Hardening Concrete

The advent of quick-hardening, high alumina cements has had a stimulating effect not only on the manufacturers of portland cement but also upon its users. This is shown by the report of A. H. Hinkle, superintendent of highway maintenance in Indiana, in an article in the *Engineering News-Record,* on quick-hardening concrete patches for highways. Mr. Hinkle wanted a quick-hardening patch to use in the place of the usual bituminous patch, which wore unevenly with the remainder of the pavement. "Lumnite" cement might have been used, but it was thought too expensive. He therefore studied the possibilities of ordinary portland cement to produce a quick-hardening mix. He found that the factors governing quick-hardening were: the richness of the mix, the use of coarse and well graded sand, freedom from excess water and the addition of calcium chloride. The temperature of the air also affected the time. By experimenting and changing the variables above mentioned, Mr. Hinkle finally succeeded in producing a mix that hardened so quickly that patches in some cases were opened to heavy truck traffic in two days after they were put down, and no damage resulted. Evidently we have by no means come to the end of the possibilities of concrete made with present standard portland cement.

A New British Cement

The quick-hardening cement problem seems to have been solved in great Britain by the advent of a new cement, which *Concrete* (London) says editorially gives higher 24-hour tests than those demanded by the British standard specification for 28 days. This cement is said to be a true portland, differing from the standard only because of refinements in the manufacture. A review of laboratory tests is published in the same journal to prove the point. The new cement is already being used on the Albert bridge at Windsor and in other important works. Quick-hardening high alumina cements are being made in Great Britain, but as the bauxite has to be imported, they are expensive and naturally a substitute for them has been sought. Coupled with the success of German manufacturers in making a quick-hardening portland cement, the advent of this new British portland cement is significant of the direction in which the whole cement industry is moving.

Old Alsen Cement Plant Ordered Sold

JUDGE HAND, in United States Federal Court at New York, has signed an order directing the sale of the Alsen Cement plant, and Earl B. Barnes, of New York, was appointed special master to conduct the proceedings. It is reported, on what appears to be the best of authority, that the owners of the outstanding bonds will rehabilitate and conduct the plant.

This is a straight foreclosure action on the first mortgage bonds. There are at present outstanding bonds worth approximately $1,200,000 and, it is understood, these are closely held. The foreclosure action is entirely independent of the receivership proceedings in which Martin Conboy, of New York, was appointed receiver and who is still acting in that capacity. The receivership action was the result of a suit brought by the J. P. Burton Coal Co., against the Hudson Valley Portland Cement Co., in 1923.—*Catskill (N. Y.) Mail.*

Oregon Portland Cement Company Resumes Operations

OPERATION of the Oregon Portland Cement Co.'s plant at Oswego, Ore., resumed February 1. The plant is being repaired and new equipment installed.

Output of the Oswego plant during the two years ending December 31, 1924, totaled 841,862 bbl. of cement, according to the report of I. C. Newlands, vice president and manager. Sales for this period amounted to 759,161 bbl.

Officers chosen were: R. P. Butchart of Victoria, B. C., president; I. C. Newlands, vice president; Carl W. Gath, secretary treasurer; H. P. Davidson assistant secretary; Chester V. Dolph, attorney. Directors: A. S. Pattullo, A. H. Devers, George Lawrence, F. I. Fuller and Edward Cookingham all of Portland, and M. J. Ballard of Salt Lake City.—*Portland (Ore.) Journal.*

Alleged Swindler Secures Portlant Cement Stock

CLAUDE C. FRITZ of Lansing, Mich., is held in the Ithaca jail and another man is expected to be arrested in connection with an alleged swindle of holders of a portland cement company stock. Fritz was arrested by state police.

The second man who has been giving his name as R. H. Benson of Owosso, is being sought under warrants issued in several counties charging embezzlement, and larceny by trick.

The two men, according to the state securities commission which has been investigating the alleged illegal transactions, posed as proxies of other stockholders and obtained signatures from the various stockholders which converted the victims' stocks over to the alleged embezzlers. Two men sold the converted stocks to brokers, pocketing the money, it is alleged.

First evidence of the operations of the men was placed before the commission by a Detroit broker, who declared he had bought $3000 worth of the stock. Investigation by the commission showed that other brokers had purchased the stock in varying amounts.—*Saginaw (Mich.) News-Courier.*

Ideal Cement Company Will Build New Plant

THE Ideal Cement Co., of Denver Colo., will start construction work in the near future on a plant to cost between $1,500,000 and $2,000,000 on a site six miles northwest of Fort Collins, Colo. R. J. Morse, secretary and general manager of the company is authority for this.

The plant will be a two-kiln plant with a daily capacity of 3500 bbl. and one of the largest in the Rocky Mountain States.

Gas will be piped to the plant from the Union Oil Co.'s wells nearby for fuel, which is expected greatly to lower the cost of manufacture. Trackage will be laid to the new plant connecting it with the Union Pacific's new Buckeye extension.—*Rocky Mountain News, Denver, Colo.*

Old Alpha Cement Plants to Be Dismantled

THE two big plants of the Alpha Portland Cement Co. at Alpha, N. J., are to be dismantled, according to the statement of an official of the company. The machinery in the plants will be disposed of for scrap and the buildings will be razed.

Years ago the manufacture of cement in Alpha and vicinity was the principal industry, but recently operations were transferred to Martin's Creek and vicinity. The Alpha plants, when erected, were regarded as among the finest in the world. The Vulcanite company still operates a mill at Alpha.—*Newark (N. J.) News.*

Wisconsin Socialist Wants a State Cement Plant

A PROPOSAL to inquire into the feasibility of state ownership and operation of a portland cement plant for highway construction was laid before the Wisconsin assembly January 21.

A resolution calling for appointment by the governor of a joint legislative committee of two senators and three assemblymen to investigate the proposition and report of the 1927 session was introduced by Assemblyman Frank Weber, Milwaukee socialist.

A $30,000 appropriation for the committee is provided in the resolution.—*Sheboygan (Wis.) Telegram.*

Rumor of a New Canadian Cement Plant

IT has been learned that the Ontario Hydro-Electric Power Commission may erect a large cement plant at the Mammoth stone quarry in Brant Township, Ont., which the commission purchased about five years ago and after spending approximately $500,000 in developing it for cement manufacturing purposes, later disposed of the entire works to a Hanover concern for $250,000.

It is understood that the Hanover company, after operating the plant for a short time and paying $150,000 of the purchase price, is willing to let the Power Commission take the quarry back for the unpaid balance and call the deal off. A commission official, with a staff of assistants, have been taking stock of the plant, presumably preparatory to reopening the quarry and establishing a cement factory.—*Toronto (Ont.) Mail and Empire.*

International Cement Company Expanding in South America

"INTERNATIONAL CEMENT CO. is spending $2,000,000 in Montevideo and Buenos Aires on plant expansion," said Holger Struckmann, president, arriving on the Scandinavian-American liner Helligolav.

"Outlook for business in South America is brighter than in a long time. The business situation brightened there with the election of President Coolidge and the people of South America feel its prosperity is dependent upon prosperity in the United States. Stocks and bonds and money values have risen in South America just as they have risen in the United States during the past two months. There is a closer relation between the United States and South America than ever before.—*New York Wall Street Journal.*

Cement Made from Titaniferous Iron Ores

ACCORDING to Edwin C. Eckel, of Washington, D. C., titaniferous iron ores yield with proper treatment a slag somewhat similar to alumina cement but having certain advantages. The ore is melted in a blast furnace with sufficient limestone to give a fusible slag containing 25 to 30% lime. Some of the iron separates and is tapped as in the usual practice. The slag is also removed at intervals, cooled by sprinkling and ground to a fine powder. The cement hardens, after a normal set, in 24 to 28 hours, the strength at all periods being far above that of portland cement. It has a gravity of 3.35 to 3.55 and the resistance to chemical attack is higher than that of portland or alumina cements. (Patent 1,511,323, October 14, 1924.)—*Chem. and Met. Engineering.*

Lime Production in 1924

THE lime sold in the United States in 1924 amounted to 4,022,000 short tons, valued at $38,670,000, according to estimates furnished by lime manufacturers to the Department of the Interior through the Geological Survey. These figures show a decrease of a little more than 1% in quantity and 3% in value from the sales in 1923. The sales of hydrated lime, which are included in these figures, amounted to 1,292,000 tons, valued at $12,972,000 an increase of about 5% in quantity and 6% in value. The average unit value of all lime showed a decrease from $9.81 a ton in 1923 to $9.61 in 1924, and that of hydrated lime an increase from $9.98 a ton in 1923 to approximately $10 in 1924.

About 53% of the total output was used in building, 41% in chemical industries and 6% in agriculture. Ohio, the leading state, showed an increase of 9% in total sales and 7½% in sales of hydrated lime. Pennsylvania, which ranked second, showed a decrease of 14%. Of the 22 states in which more than 25,000 tons were sold, only eight showed increased sales. The demand for building lime differed greatly in different states. In the Northeastern states some producers reported large increases, others large decreases and still others little change. The differences in other states east of the Mississippi were less marked, but few showed increased sales, and the final stastistics may not show an increase in any of these states except Ohio, Wisconsin and perhaps Alabama. Producers in the West Central states, with few exceptions, reported that the sales of building lime were nearly the same as in 1923 or somewhat less. The sales in the Rocky Mountain and Pacific coast states, except California, were equal to those in 1923 or larger.

The sales of chemical lime also varied, but most of the producers reported decreases or practically no change. The final figures may show increased sales in New York, Indiana, Missouri, Alabama and a few states that are small producers, but the total sales will probably be a little less than in 1923.

The demand for lime for use in agriculture was about the same as in 1923 in most states, but in Maryland and Virginia, which rank among the large producers of lime for this use, the sales will doubtless be less than in 1923.

The accompanying table shows the estimated sales of lime in 1924 and the sales in 1923 for comparison.

Alabama Lime and Stone Corporation Takes Over O'Neal Lime Works

THE Alabama Lime and Stone Corp., capital stock $2,000,000, has taken over the O'Neal Lime Works, Inc., and its extensive lime rock properties in Shelby county, Alabama, near Callera, 30 miles from Birmingham.

Immediate development of the property is planned. A plant to be erected which will not only manufacture lime but the byproducts of the same, no other plant of the kind being located in the South today.

Shadburne Brothers, of Chicago, have bought the bonds of the Alabama Lime and Stone Corp., amounting to $1,500,000, and the contract for the construction of the plant has been given to the Schaffer Engineering Co., of Pittsburgh, Penn., 50 to 60 cars of machinery, purchased recently, now being prepared for shipment, the work on the erection of the plants to be started soon.

The officers and directors of the Alabama Lime and Stone Corp. are John H. Adams, Birmingham, president and manager; Frank C. Marquis, vice-president of the Pratt Fuel Corp., vice-president; W. W. Wood, vice-president of the W. D. Wood Lumber Co., vice-president; Albert Stradford, auditor and president of a local printing establishment, treasurer. Directors: Dr. W. C. Gewin, physician and surgeon and proprietor of the Birmingham General Hospital; Frank C. Miller, general manager of the Sloss-Sheffield Steel and Iron Co. byproduct plant; W. J. Yeilding, president of Yeilding Brothers, wholesale grocers; W. F. Hull, capitalist, of New York.

Because of the fact that the company has over 5000 acres in and surrounding Callera, and both kinds of limestone thereon, in addition to its deposits of clay, shale, etc., and the railroad facilities — Alabama Mineral, Louisville & Nashville, and Southern railway—it has been decided to build the new plants at Callera, about three blocks to the west of the joint railroad passenger station.

The Alabama Lime and Stone Corp. owns about 9000 acres of mineral lands in Shelby county, including 4000 town lots of Callera. The O'Neal Lime Works, north of Callera, which business was established in 1880 by Charles L. O'Neal, is taken over. The company is manufacturing now Eureka lime and Snow White hydrated lime. In addition to the large deposits of both calcitic and dolomitic limestones, the properties contain coal and iron ores, beisdes shale and cement rock and high-grade fire clays.—*Birmingham (Ala.) News.*

Reduced Rates on Fertilizer Materials Asked in North Carolina

THE State Railroad Commission of North Carolina heard arguments of counsel for shippers, carriers, and the public on the matter of South Carolina rates on fertilizer and related articles at the office of the commission at Columbia, S. C., recently.

Among the complainants, in an effort to secure a readjustment of interstate freight rates on this agricultural commodity, were the Virginia-Carolina Chemical Co. of Richmond, the Charleston Traffic Bureau, the International Agricultural Chemical Co. of Atlanta, the Spartenburg Transportation Association, the American Agricultural Chemical Co. of Columbia and J. L. Coker & Co. of Hartsvile, S. C.—*New York City Journal of Commerce.*

LIME PRODUCED IN THE UNITED STATES IN 1923 AND 1924

State	1923 Hydrated lime (Short tons)	1923 Total lime Short tons	1923 Total lime Value	1923 Av. value per ton	1924 (estimated) Hydrated lime (Short tons)	1924 (estimated) Total lime Short tons	1924 (estimated) Total lime Value	1924 (estimated) Av. value per ton
Ohio	601,082	867,982	$ 8,740,688	$10.07	646,000	945,000	$ 9,377,000	$ 9.92
Pennsylvania	177,836	772,839	6,372,732	8.25	177,000	679,000	5,465,000	8.05
Wisconsin	19,736	227,549	2,055,646	9.03	18,600	245,000	2,190,000	8.94
West Virginia	52,954	241,601	2,029,061	8.40	14,000	234,000	1,840,000	7.86
Missouri	63,823	246,326	2,505,785	10.17	63,300	231,000	2,178,000	9.43
Alabama	19,526	193,429	1,627,539	8.41	22,700	212,000	1,754,000	8.27
Massachusetts	(*)	180,720	2,550,575	14.11	(*)	190,000	2,763,000	14.54
Virginia	32,189	182,604	1,490,306	8.16	36,000	170,000	1,356,000	7.98
Maine	(*)	139,781	1,946,486	13.93	(*)	124,400	1,671,000	13.43
Tennessee	40,558	131,995	1,028,158	7.79	38,000	117,000	923,000	7.89
Indiana	43,051	126,296	1,151,083	9.11	44,700	116,000	985,000	8.49
New York	(*)	100,862	1,037,737	10.29	(*)	99,000	978,000	9.88
Illinois	15,590	92,633	978,658	10.56	22,600	96,000	1,034,000	10.77
Michigan	(*)	59,629	612,369	10.27	(*)	73,000	704,000	9.64
Texas	22,935	62,822	606,976	9.66	25,400	62,000	584,000	9.42
Connecticut	(*)	59,158	813,254	13.75	(*)	58,500	797,000	13.62
Vermont	(*)	58,681	702,588	11.97	(*)	58,400	677,000	11.59
California	(*)	66,703	869,979	13.04	(*)	52,000	633,000	12.17
Maryland	34,783	63,858	553,811	8.67	29,000	51,000	421,000	8.25
Washington	(*)	25,895	359,510	13.88	(*)	31,000	387,000	12.48
Arizona	(*)	18,764	264,683	14.11	(*)	26,000	321,000	12.35
Minnesota	(*)	29,805	339,957	11.41	(*)	25,500	286,000	11.22
Undistributed	101,865	126,311	1,356,071	.....	154,700	126,200	1,346,000	.....
	1,225,928	4,076,243	$39,993,652	$ 9.81	1,292,000	4,022,000	$38,670,000	$ 9.61

* Included under "Undistributed."

Kansas City Sand Firms Merge and Will Lower Prices

THE Stewart Sand Co., largest producer and retailer of sand in Kansas City, Mo., has purchased the Kaw River Sand Co., which was the next largest producer of sand in that city.

In confirming the sale, John Prince, president of the Stewart Sand Co., forecasts a reduction in the price of sand immediately after the merger of the companies has been completed.

He said the cost of production would be decreased, due to the merged facilities, and that the reduction in cost of production would be reflected at once in a reduction of the price of sand.

It was reported the price paid for the Kaw River Sand Co. property and good will was about $400,000. Mr. Prince would not confirm the price involved in the sale.

C. W. Bartlett, president of the Kaw River Sand Co., will become vice-president of the enlarged Stewart Sand Co., Mr. Prince announced. The Stewart Co., he added, would take over the Kaw River organization. Mr. Bartlett, however, will be the only Kaw River company officer in the Stewart organization.

The Kaw River Sand Co., operates three producing plants on the Missouri river and two retail sales yards here. The Stewart Co. operates four producing plants on the river and five retail yards.—*Kansas City (Mo.) Times.*

River Traffic at Pittsburgh Shows Heavy Sand and Gravel Shipments

ACCORDING to the monthly report of Major E. L. Daley of the U. S. engineers, there was a total of 2,639,467 tons of freight moved on the three rivers in the Pittsburgh harbor during the month of December divided as follows: Allegheny, 178,068 tons; Monongahela, 1,896,821 tons, and the Ohio, 564,578 tons.

Coal, gravel, and sand were the heavy items of the report. Gravel ran 35,640 on the Allegheny, 44,900 on the Monongahela, and 62,185 on the Ohio. Sand totaled 49,985 tons on the Allegheny, 59,118 on the Monongahela, and 83,060 on the Ohio.—*Pittsburgh (Penn.) Press.*

Sand Company Is Fined for Violating an Injunction

JUSTICE WILLIAM P. BRENNAN of Buffalo, N. Y., has handed down a decision fining the Holloway Sand Co., Inc., about $1500 for several violations of an injunction which restrained it from sucking sand and gravel in the Niagara river in the vicinity of Squaw Island. The matter was pressed by the Squaw Island Freight Terminal Co., Inc., owner of the property, who claimed that the sand company was causing a portion of the island to be eaten away.

The Squaw Island company has exclusive right to the underwater lands surrounding the island within the shore line and the pier head lines established by the United States Government so as to provide for the future construction of piers.

Plaintiff claimed that the gravel sucking operations were within these proscribed lines and that the operations resulted in depriving Squaw Island of some of the lateral support from the adjoining lands under the water surrounding it.

"I have no doubt," said Justice Brennan, "that the defendant, with at least culpable negligence, entered within the field from which the injunction orders excluded it. In any event, whether intentional or inadvertently, the defendant violated the injunction."

The fine imposed was only a part of the plaintiff's costs in proving its case.—*Buffalo (N. Y.) Express.*

Tractor City Sand and Gravel Company to Build New Plant

EXTENSIVE plant improvements for 1925 that will increase production 50% are planned by the Tractor City Sand and Gravel Co., Janesville, Wis., according to O. G. Olsen, president. These plans include the erection of a wet screening plant and purchase of additional loading equipment at an approximate cost of $30,000. The addition of this equipment will enable the firm to produce seven grades of material and put it in position to take care of all sizes of material used.

In addition to a selling agency in Chicago, the company has recently added E. J. Sartell to its Janesville office as sales manager.

Officers of the company, in addition to President Olsen, are C. H. Kimball, vice-president; H. S. Thometz, secretary, and F. H. Howe, treasurer.

Interstate Sand and Gravel Company Transfers Its Property

TRANSFER of the Interstate Sand and Gravel Co. property at Libertyville, Wis., to Mary J. Powers of Chicago has been recorded at Waukegan, Ill.

The deal is said to have gone through some time ago and that the real owners are the Racine Crushed Stone Co., which is in reality the North Shore railroad, and that Samuel Insull is back of the proposition, he being interested in buying up many large tracts not only at Libertyville, but along the entire north shore.

The stamps would indicate that the deal amounts to $21,000, but there are, it is believed, other considerations which would bring the actual amount much higher.

The company last week took over a large number of houses adjoining the gravel pits. These are being moved away and the company plans to start excavations for the removal of sand and gravel where these houses stood.—*Waukegan (Ill.) Sun.*

Silica Sand Plant to Be Built Near Corona, Calif.

PLANS for the erection of a modern silica products plant on the Pacific Coast for the Corona Silicate Sand Co., near Corona, Calif., have been announced by the Southwestern Engineering Corporation.

The plant will have an initial capacity of 100 tons a day of washed silica sand products, consisting of plateglass, common-glass, bottle-glass, moulding, and and blast sand.

The sand will be washed, screened, classified and passed over concentrating tables, delivering a clean silica product free from soluble salts, muscovite and ferrous compounds.

The plant will be completed and ready to begin operations within the next sixty days, according to officials of the corporation. Equipment to be provided includes bins, elevators, conveyors, washers, filters, separating tanks, classifiers, concentrators, screens, pumps, transmission machinery, pit equipment and loaders.—*Los Angeles (Calif.) Times.*

New Sand and Gravel Company in Central New York

W. L. SPORBORG, A. G. Seitz, and M. D. Winsor of Syracuse, N. Y., have formed the Oxford Sand and Gravel Co. and taken over the plant and business of the Ballina Sand Co. at Ballina, about 30 miles from Syracuse. The new owners are well known in the rock products industry. Mr. Sporborg and Mr. Seitz are at the head of the Rock Cut Stone Co., which has two quarries and crushing plants in the vicinity of Syracuse. C. A. Adams is to have charge of the sand and gravel plant.

Consolidation of California Sand and Gravel Companies

ONE of the largest mergers of building material firms ever made in southern California was announced recently when it became known that Harris-Hull, Inc., had absorbed the Clarke Rock and Gravel Corporation, the Roscoe Rock and Sand Co., and the Sherman Building Material Co. This has resulted in the formation of Harris and Hull, Inc., making it the largest building material corporation in the Los Angeles territory, according to its officers.

Officers of the new corporation are: J. G. V. Clark, president; Robert L. Chambers, vice president; Y. E. Clarke, secretary-treasurer. Directors are the above mentioned and Clayton Hull, J. A. Harris and Carroll Huffman.

The Harris-Hull Co. was formed in April, 1922, and started operation in a very small way with two trucks. At the present time they are operating over 60 trucks hauling sand and gravel for many of the large buildings in Los Angeles, Cal.—*Lankershim (Calif.) Press.*

West Virginia Sand and Gravel Company Buys $90,000 Towboat

CONTRACT for construction of a steam towboat at a cost of $90,000 has been let by the Union Sand and Gravel Co. of Huntington, W. Va., J. L. Richmond, president of the company has anounced.

The steamer is to be of all steel construction, with engines of 450 hp. The craft will be capable of towing eight barges laden with sand.

The boat will be completed in about six months, it is expected.

Purchase of the new craft, according to Mr. Richmond, was made necessary because of the proposed extension of operations by the Union Sand and Gravel Co. The company recently announced the purchase of Raccoon Island, a body of land lying in the Ohio river 32 miles north of Huntington, said to be thickly underlaid with sand and gravel.

The new craft will supplement the company's present fleet of towboats and barges. One gasoline towboat and one steam towboat are to be in operation by the coming year.—*Point Pleasant (W. Va.) Register.*

Missouri Portland Cement Company Improves Its Memphis Gravel Plant

WORK has been started on a new reinforced concrete machinery super-structure for the Missouri Portland Cement Co. at its plant at Hollywood, Tenn.

The new machinery will make it possible to draw barges filled with sand across the lake on the company's property to the screening and washing plant now in use. For some time past a long flume has been in use, but when the new super-structure is completed, the barges will be unloaded by clamshell buckets.—*Memphis (Tenn.) News-Scimitar.*

Lansing, Mich., Gravel Men Seek to Buy Developed Property for Gravel

HOME owners on Willow street in Lansing, Mich., are speculating on the attempts of gravel miners to obtain options on property in the section named. Offers, it is said, have already been made for property along the river, which makes a bend to the north and west at the east end of Willow street.

It is said the options would not disturb any home owner as only the rear of the lots are said to be desired by those engineering the plan. Offers were made for parts of lots sloping down to the river.

It is claimed that there is a vein of gravel from 35 to 50 ft. thick underneath the gardens that have been worked for years by home owners from the east end of Willow street to Seymour. It is planned, it is said, to effect an entrance to the "mines" on the Hewitt property at 109 East Willow street.

The cost of transporting gravel from outside pits to construction jobs within the city limits continues to grow annually. In event the "mines" along the Willow street river front prove what is claimed for them, the ease of transportation would cut considerable figure in the cost of gravel, especially for north side construction work.—*Lansing (Mich.) Journal.*

Turner Gravel Company of San Antonio Rejuvenates Two Old Companies

THE growth of the Turner Gravel Co. of San Antonio, Texas, is a good illustration of how a rock products industry may be built up on what had previously been called a failure. The company was organized in 1922, and took over two plants that had been operated only at a loss. The first improvement made by Mr. Turner, the president of the company, was to put in a washing plant that would turn out screened and cleaned material. This plant was designed by the Link Belt Co. Additional bin capacity was added to the plant and a deep well put down. The system of compressed air pumping was installed instead of a pump jack and deep well pump such as had been used on another well connected with the plant. The new system doubled the water supply without increasing the cost of pumping.

One of the two old plants did not need to be replaced and this was brought up to date by changing the flow sheet, adding new bins and putting in sand washers, made by the Good Roads Machinery Co., to save sand that had formerly been sent to waste.

Materials are shipped from these plants by truck to San Antonio, which is 10 miles away, and throughout a large district surrounding the plant by rail. The present year's business has been 150,000 tons and it has grown from a small output by increasing the ability of the plant to produce a clean and well graded material.

Other officers of the company are: W. W. Lehr, vice president and F. L. Hetlage, secretary-treasurer.

Henry Ford May Make Plate Glass from Minnesota Sand

PLATE glass has been successfully made in the laboratories of the Ford Motors Co. at Detroit, Mich., using sand from southeastern Minnesota.

These experiments have been carried on, according to reports from geologists at the University of Minnesota, to determine the possibility of making plate glass on a commercial basis in Minnesota. The problem of obtaining cheap fuel is now the main obstacle and this may be obtained as a byproduct from the new Ford plant at the high dam in Minnesota.

If this fuel problem is solved, considerable plate glass may be made in Minnesota to supply middle west markets.

Iowa Sand and Gravel Producers Hold Annual Meeting

THE Iowa Sand and Gravel Producers Association met in Des Moines on January 22 in annual session. A good attendance was present and much enthusiasm shown.

Officers elected for the year were: Ed Gray, Des Moines, president; Grant McGowan, Mason City, vice president; and R. Snoddy, Des Moines, secretary-treasurer. Other members of the board consist of Floyd Goodrich, Oskaloosa, and C. V. Ray, Des Moines.

The association was found to be in good condition with no obligations and $1000 cash in the treasury. About 75% of the tonnage of the state was represented in the attendance.

Sand Dredging at Apostle Isles, Lake Superior

THE rapid increase in the use of cement has caused a corresponding demand for sand. The Apostle Isles now furnish most of the sand supply for Ashland, Wis.; a considerable quantity also going to Duluth-Superior, Fort William and Port Arthur. The sand is dredged in the shallow water around the islands. Tugs towing scows with dredging apparatus put in the whole season in this trade.

In some cases, land owners on the islands have warned off the sand dredgers because of the damage done by seas from the open lake resulting from the dredging. A large supply of sand connects the main shore with Sand Island, Lake Superior. There is shoal water between the island and the main shore, and the beds are easily dredged, but considerable quicksand exists, making the supply unsuitable for cement.—*Duluth (Minn.) Herald.*

American Sand Association Elects Officers

THE American Sand Association, an organization of silica sand producers, met in Cleveland, Ohio, January 13, and elected the following officers:

F. L. Moore, president, The Peerless Sand Co., Conneaut, Ohio; H. G. Leonard, first vice president, the Oliver Silica Sand Co., Massillon, Ohio; Ira E. Bixler, second vice president, Enterprise Sand Co., Pittsburgh, Penn., and Hubert B. Fuller, secretary and treasurer, 826 Guardian building, Cleveland, Ohio.

Wind-Up of the Monmouth Stone Company

THE equipment of the Monmouth Stone Co. east of Gladstone, Ill., which was sold several weeks ago, is now being moved to Birmingham, Alabama, to be used in a stone quarry of considerable size.

Missouri Senate Investigating McDowell Quarry Deal

THE readers of ROCK PRODUCTS have been kept fairly well informed as to the situation in Missouri, due to the effort of the Highway Commission of that state to produce road-making material rather than buy it from the established producers. The latest development is that the Missouri State Senate has a committee investigating the deal by which R. Newton McDowell of Kansas City was financed in the construction and operation of the Smithville and Gallatin quarries. The Smithville plant was described in the annual review number (December 27) of ROCK PRODUCTS.

Concerning the investigation, a dispatch signed by A. Curtis Betts, in the *St. Louis Post-Dispatch*, says as follows:

"A peculiar use of state funds in private enterprise was presented to the Senate Investigating Committee late yesterday afternoon in the form of contracts entered into by the State Highway Department for obtaining crushed rock for use in road construction.

"The interpretation placed on the contracts by Senator Farris, chairman, and Senator McCawley, both lawyers, was that the Highway Commission had invested $250,000 of state funds in equipment for two stone quarries, which were to be operated privately, the owner to pay rental to the Highway Commission at the rate of 20 cents for each ton of stone. At the end of a five-year period the owner of the quarries was to purchase the equipment from the state at its original cost, the rental he had paid in that time to apply on the purchase price.

"Senator McCawley, who almost invariably is a defender of the Highway Commission, expressed surprise at the form of the contracts after the adjournment of the committee meeting.

"It appears," he said, "that the Highway Commission has loaned a private individual $250,000 of the state's funds for a period of five years without interest. Even at simple interest the value of this money for that period was $75,000. It certainly cannot be considered good business judgment.

"The contract was made by the Highway Commission with R. Newton McDowell, formerly of St. Louis, but for several years a resident of Kansas City. McDowell obtained two stone quarries, one in Smithville, Clay county, and one in Gallatin, Daviess county. He contracted to furnish crushed rock from the quarries at $1.25 a ton.

"It developed in the testimony of B. H. Piepmeier, chief engineer of the commission, who produced the contracts on subpœna, that the Smithville quarry so far had proved unproductive of stone usable in road construction, and that only 10,278 tons had been received from the Gallatin quarry. Under the terms of the contract, McDowell agreed to have both quarries producing stone by June 1 last.

"Piepmeier testified that because of delays in the receipt of machinery, McDowell was granted an extension on his contract time, and that one quarry began production in September and the other in November.

"The failure to get out stone at the time required and in the quantity demanded, he testified, made it necessary for the commission to purchase stone at a higher price from other quarries. The excess paid amounted to $16,000 which, he testified, the commission had charged up to McDowell.

"McDowell gave bond for the execution of his contract and for the purchase of the equipment at the end of the five-year period, but Chairman Farris, after reading the contracts and bonds, expressed the opinion that there was considerable doubt that the surety on the bond could be held for the failure to produce the stone.

"Piepmeier's testimony was that about a week ago a demand had been made on McDowell and a copy of the demand had been sent to the surety company. He said no reply had been received.

"While Piepmeier admitted that the Smithville quarry stone was not usable as so far produced, he denied that all of the stone there was useless, explaining that the difficulty had been that there was clay and shale between the layers of rock, and that the quarry was not equipped with machinery to clean it. He said the cleaning machinery was being installed by McDowell at his own expense, and that ultimately usable stone would be produced.

"After the adjournment of the hearing, Piepmeier told newspaper men that he believed the quarry deal would work out all right, but that if the worst should come, the state would lose not to exceed $25,000. He said an engineer had appraised the machinery and that if it were sold and the commission realized $125,000 on McDowell's bond, the loss would be $25,000.

"The committee is proceeding on the theory that the investment of state funds in quarry equipment to be operated privately was a violation of the Constitution.

"In this connection they cite two sections of the Constitution: 'Article 4, Section 45: The General Assembly shall have no power to give or to lend, or to authorize the giving or lending of the credit of the state in aid of or to any person, association, or corporation, whether municipal or other, or to pledge credit of the state in any manner whatsoever, for the payment of the liabilities, present or prospective, of any individual, association of individuals, municipal or other corporation whatsoever.

"'Article 4, Section 46: The General Assembly shall have no power to make any grant, or to authorize the making of any grant, of public money or thing of value to any individual, association of individuals, municipal or other corporation whatsoever; provided, that this shall not be construted as to prevent the grant of aid in a case of public calamity.'

"While there is no contention that the General Assembly had anything to do with the contracts, it is the theory of the committee that a creature of the legislature, such as the Highway Commission, would have no power under the Constitution to do the thing the General Assembly was specifically prohibited from doing.

"There appears to be a difference of opinion among lawyers as to the legal aspects of the matter. Piepmeier testified that it was his understanding the commission obtained an opinion from the Attorney-General and also from its own counsel before it made the deal with McDowell."

[Those who are interested will find Mr. McDowell's explanation of his deal with the Missouri State Highway Department in an article by him in ROCK PRODUCTS, June 14, 1924, p. 57. The whole case is an interesting commentary on the attempt of state officials to engage in business outside of what any normally-minded government official would consider properly belonged in his province. In other words, the Missouri people seem to have gone out of their way to invite trouble, and they have reaped a full measure of it. —The Editors.]

R. Newton McDowell Owner of Blackwater Quarry

A DEAL was completed recently whereby R. Newton McDowell of Kansas City, Mo., became the owner of the stone quarry at Blackwater. The purchase price was $40,000.

Mr. McDowell bought the quarry from the S. J. White Stone Co., who had purchased it last November for $8,000. Stone on the property is said to be very valuable.—*Boonville (Mo.) Republican.*

Operations Will Be Resumed in Quarries at Richland, Texas

THE James Stone Co., capitalized at $1,000,000, and to whom a charter has but recently been granted by the secretary of state at Austin, has taken over the quarries and other assets of the Buckeye Stone Co., at Richland, Tex., according to a statement given out by W. S. James, president of the new company.

The Buckeye Stone Co.'s plant at Richland has been idle for several years. Operations are to be resumed at once. Limestone for building purposes will be quarried from the plant.—*Houston (Tex.) Dispatch.*

South Carolina Quarry Changes Its Name

THE Beverly Stone and Sand company, which operates a large granite quarry in Pickens county, South Carolina, is now the Holston Quarry company of South Carolina, the new name becoming effective January 1.

There is a Holston Quarry company in Tennessee operated by the same interests that operate the Beverly quarry and it was decided to have quarries in the two states operate under the same name. The management of the South Carolina concern has not changed.

Former Mayor H. C. Harvley of Greenville is agent for the company in the two Carolinas.—*Greenville (S. C.) News.*

Central New York Quarry Doubling Plant

CONSIDERABLE new machinery is to be added to the Munnsville quarries of the F. E. Conley Stone Co., Oneida, N. Y., which will double the capacity of the plant. It includes screens, elevators, conveyors, and bins.

The quarry has sufficient holdover orders and new contracts to keep it going full time until July 1. Shipments last year aggregated 2000 cars, or 100,000 tons, the largest in the history of the concern. They averaged 300 cars a month.

The company is constructing a tunnel 4 ft. wide and 6 ft. deep, 50 ft. below the tracks of the O. & W. railroad, to take care of surface water.—*Oneida (N. Y.) Dispatch.*

Famous Arroyo Seco Dispute Over Rock Crushing Ended

ACCORDING to Los Angeles, Calif., newspapers, the dispute between the city of Los Angeles and the Los Angeles Rock and Gravel Co., over the crushing of rock in the Arroyo Seco, has been ended by a compromise. A number of lawsuits and condemnation proceedings have grown out of this dispute. The compromise gives the city certain rights to fill in exhausted ground and the company agrees to backfill certain areas and to cease operations in the locality at the end of 1927.

County Enjoined from Selling Rock in Competition With Regular Producers

OSAGE County, Okla., was permanently enjoined from selling or otherwise disposing of crushed rock to private parties in an injunction suit recently. The suit was brought by Richard Easter of Pawhuska, Okla.

Mr. Easter took the stand and explained that the county had disposed of rock to the Hamilton Construction Co., for jobs in the north and west parts of Pawhuska. He stated that he was running a rock crushing plant.

A truck driver for the Hamilton Co. stated that he had hauled rock from the county crusher on one or two occasions. Paul Smith, who has charge of the county crusher, testified that the county had sold rock to the Hamilton Co., for a project which the county was interested in, the contract being made for that reason. He stated also that the county had disposed of rock to Clement De Noya for use in a new ice plant, adding that the crusher was located on land controlled by Mr. De Noya and that the latter was accepting the rock as payment for the use of his land instead of cash.—*Pawhuska (Okla.) Journal.*

Financing New Rock Asphalt Company in Ft. Scott, Kansas

A COMPANY with several hundred thousand dollars of capital is being organized in Fort Scott, Kans., to open up and develop the rock asphalt field recently discovered some 10 miles southeast of Fort Scott. Mrs. M. F. Hufty, who has leases on several thousand acres of land in that vicinity on which the rock asphalt has been found, has just moved to Fort Scott, and is making progress in financing the company. She has interested Kansas City capital and feels assured of securing a development on a scale ten times as large as originally anticipated.

Samples of this rock asphalt, which seems to underlie a large area of the Vernon county farm land southeast of Fort Scott, have been tested at the laboratory of the Missouri University and the state highway department and have been pronounced of finer quality than the famous Kentucky rock asphalt, which is used all over the United States for paving and resurfacing purposes.—*Fort Scott (Kans.) Tribune.*

California's Rock Products Output

THE report of the California State Mining Bureau for 1924, says in regard to the rock products industries:

As the demand for building materials continued active during 1924, nearly all items of the structural group will show increased quantities and total values, especially cement, crushed rock, sand and gravel. Magnesite shipments decreased about 15% in quantity, and the market price dropped off somewhat, owing to increased imports from India. The demand for this material for stucco and other plastic purposes is showing a healthy growth.

Estimated quantities and values for 1924 are tabulated as follows:

$28,320,000 (11,800,000 bbl.) cement.
$17,000,000 crushed rock, sand and gravel.
$704,000 (64,000 tons) magnesite.
$6,000,000 miscellaneous "industrial" minerals (including asbestos, barytes, pottery clays, dolomite, feldspar, gems, graphite, diatomaceous earth, limestone, lithia, mineral water, shale oil, silica, talc, et al.)

Union Rock Company Complains of Rates on the Pacific Coast

THE Union Rock Co., operating extensive pits in the vicinity of Los Angeles, Calif., has filed formal complaints with the State Railroad Commission charging that freight rates of the Santa Fe, Southern Pacific, and Pacific Electric are discriminatory and excessive. Rates on shipments of this nature in northern and central California are considerably lower than local rates, according to the company. The company operates rock and gravel pits at Kincaid on the Santa Fe, at Crushton, Baldwin Park, and Rivas on the Southern Pacific, and at Puente Largo on the Pacific Electric.—*Los Angeles (Calif.) Times.*

St. Paul Construction Firm Leases Quarry

THE Koss Construction Co., of St. Paul, which is building the Mendota bridge, has taken a lease on the Hastings, Minn., quarry.

The lease is expected to result in resumption of activities at the quarry, with employment of a large number of men as the construction company has a number of large projects under way.

The transfer, it was announced, was effective January 1, and mechanics now are getting the plant in readiness to start work as soon as the weather permits.

The plant is the property of the Calcium Products Co., Hastings.—*St. Paul (Minn.) News.*

Mysterious Blast Injures Four Men

JOHN CANAPE suffered serious injuries about the eyes, and John Lane received superficial injuries about the head and face, as the result of a blast in the quarry of the Acme Cement Co., five miles from Catskill, N. Y., recently. Nick Veri, who was working foreman of the quarry, and John Kupsich, who were working near the quarry at the time of the explosion, suffered temporary deafness, but will be all right in a few days.

All the injured men were taken at once to the emergency hospital at the Acme plant.

A mystery surrounds the cause of the explosion. Holes were being prepared for blasting in the quarry, and the men engaged had finished loading six holes and were on the seventh when the blast occurred. No firing attachment had been made and the seventh hole had not been tamped, but for some reason this seventh hole went off.

A very thorough examination is being made by the officials of the company in connection with the manufacture of the explosives, to ascertain if possible the cause of the premature explosion, as there was no fuse or exterior explosive around at the time which could have caused it.—*Kingston (N. Y.) Freeman.*

Slate Men Hold Annual Meeting

The 1925 Conference the Most Successful Gathering of Slate Producers and Manufacturers in the History of the Industry

THE 1925 Slate Industry Conference at the Hotel Commodore, New York, was the most successful and representative gathering of slate interests in the history of the industry. From the moment the slate men began to assemble on Monday, January 19, to the final adjournment on Wednesday, the 21st, there was maintained a keen interest in all that pertains to the advancement of the production and uses of slate.

Over 250 producers, dealers, roofers and setters met for a discussion of their general and specific problems, coupled with the luncheon gathering arranged by the concerns who furnish this industry equipment and supplies, which brought upwards of seventy-five representatives of such firms in close contact with the men to whom they provide the tools and materials of their trade. Government experts, presidents and representatives of national associations having relations with the slate industry, scientists who are versed in the uses and effectivenes of slate under all conditions, gave to the conferences a wealth of information and results of research which will have a definite effect on the future of the industry.

In the unavoidable absence of President George F. Barnard of Boston, the chair was occupied by Vice-President G. H. Shinville of Fair Haven, Vermont, who opened the Monday luncheon session with a word of welcome to the assembled members. Slate Chaplain Hamm pronounced the invocation, during which he feelingly referred to leaders of the industry who have passed on during the year.

Albert Kelsey, the noted Philadelphia architect, was heard in a fine address that contained many helpful and informative facts, as well as providing an inspiration for better things during the new year. James S. Hamilton, industrial commissioner of the state of New York, extended through deputy Richard J. Cullen, a welcome as the personal representative of Governor Al. Smith. Messages were read from other governors of slate-producing states with a climax furnished in a telegram of good cheer from President Coolidge, whose native state of Vermont is prominent among the important slate-producing states.

Following the luncheon, those in attendance met in various groups for discussion of matters relating to their particular interests, including milled and roofing slate producers, with G. H. Shinville in the chair, dealers' and jobbers' section, E. J. Johnson presiding; crushed and ground slate producers, Chas. A. Long, chairman; setting contractors, with Messrs. Kenney and Henry leading the discussion; roofing contractors, under the leadership of Messrs. Daniel, Fell and Miller; milled and roofing slate salesmen, F. H. Abel and John R. Hoffman in charge.

G. F. Loughlin of the U. S. Geological Survey released the advance report on estimated slate sales for 1924, which showed a total of $11,816,000, only 2% less than 1923, the best year of the industry. The reduction was slight in spite of labor troubles in some of the Pennsylvania districts, which so seriously crippled the industry and greatly reduced output, and clearly indicate that the industry under normal conditions would have made 1924 the banner year of the industry.

A series of experiments, tests, and research arranged by the research and tests committee, W. A. Kitto, chairman, were conducted by Robert Notvest, imparting much information on some of the abtruse problems related to the uses of electrical slate and the acid and alkali resistive properties of slate.

Social Side of Meeting

The annual dinner marked the high-water mark in attendance and enthusiasm, with entertainment provided by some of the best cabaret artists in New York. Under the skillful guidance of Toastmaster E. D. Raymond, events followed thick and fast, interspersed with a fine talk and message of good-will from D. Everett Waid, president, American Institute of Architects. At the speakers' table were also Rudolph P. Miller, C.E., chairman, Building Officials Conference; I. H. Woolson, C.E., for the National Board of Fire Underwriters; A. C. Streamer, chairman, Panelboard and Switchboard Section, Associated Manufacturers of Electrical Supplies; C. W. McCaulley, vice-president, Tile and Mantel Contractors' Association; Edwin L. Seabrook, secretary, National Association Sheet Metal Contractors; B. Joseph O'Donnell, National Association of Master Plumbers. Following the dinner, the entire gathering visited the Ziegfeld Follies at the Amsterdam Theater, where several rows of seats had been reserved for the slate crowd. Here they listened to Will Rogers' humor about slate and its uses and applauded vigorously at the catchiest number on the program, with Ann Pennington and her schoolmates working out their problems on the indispensable school slates of a "school days" number.

Tuesday events included a continuance of group meetings and the annual business meeting of the National Slate Association, at which officers and directors for 1925 were elected as follows:

President, N. M. Male, Pen Argyl, Penn.; vice-president, F. C. Sheldon, Granville, N. Y.; treasurer, A. H. Morrow, West Pawlet, Vt.; directors and districts, Wm. Wright, Canada; G. F. Barnard, Maine; E. R. Norton, New York; F. C. Sheldon, Vermont; G. H. Shinville, Vermont; Wm. H. Smith, Bangor; N. M. Male, Pen Argyl; James Owens, Slatington; R. D. Chapman, Chapman; J. C. Gorsuch, Peach Bottom; W. A. LeSuer, Virginia; C. A. Lowry, Western; James O'Brien, Vermont director at large; W. S. Ditchett, Pennsylvania director at large.

Due to the elevation of Messrs. Male and Sheldon to the presidency and vice-presidency, respectively, vacancies were created in the directorate which will be filled at the next meeting of the board.

The Hosts' Club luncheon tendered the slate trade by 35 concerns furnishing equipment and supplies proved to be a most successful affair, conducted under the direction of C. S. Jackson, of the Quarry Supply Co., Pen Argyl, Penn., who officiated as toastmaster. This was the second event of this character and roused the enthusiasm of the guests to such a pitch that the hosts of the occasion were formally declared associate members of the National Slate Association, as a definite branch of the organization to be known as the Hosts Club. Harry Collins Spillman, an exponent of personality, talked on the subject of "Adjusting Ourselves to a New Era in Business." Slate Chaplain Hamm led the singing with vim and spirit. He was aided in the entertainment features by Marveelous, a magician of unusual ability and humor, and Miss Ruth Wells, whose amazing pulchritude made the slate bunch sit up and take particular notice.

Not the least interesting feature of the conferences was the first showing of the Slate Movie, a graphic presentation of present methods. This movie will be of real value to the slate industry for lecture purposes to architectural schools and other institutions, and several requested it be shown before their business men's clubs. It has been assigned a place in the catalogue ofthe Pathescope Company among the educational films, under the title of "Quarrying and Shaping Slate—Nature's Product of Manifold Utility."

The value of services rendered the slate industry by Robert Notvest, the research and electrical engineer of Cleveland and D. W. Kessler of the Bureau of Standards of the Department of Commerce at Washington, was fittingly recognized by their election to honorary membership in the National Slate Association.

One of the direct evidences of the growing importance of organization to the slate industry was expressed in the decision to have the association in view of its accomplishment and progress during the past few years, carry through more intensive development work on the problems of each district. To this end, plans are being worked out to bring about more meetings of members and producers in each particular district for consideration of their distribution and production problems and for better advertising and sales promotion of the particular uses of their kinds of slate.

Universal Portland Cement Company to Install Dust Collectors

OFFICIALS of the Universal Portland Cement Co. have confirmed the report that its board of directors has appropriated $80,000 for the installation of additional dust-collecting apparatus and plan to complete the proposed work in 1925.

A large expenditure was made by the cement company in the year just ended to eradicate the greater portion of the dust discharged from its several mills at Buffington, Ind. With the additional installation of dust collectors this year, it is the opinion of officials that all alleged nuisance will be abated.

These improvements are in line with the annual budget of betterments made each year at the Universal plant. In 1924, No. 3 plant was equipped with dust collectors, a new boiler plant was erected, a concrete subway beneath the Pennsylvania railroad tracks to the mill gates completed, and a series of bunk houses for workmen constructed.—*Calumet Record, Chicago, Ill.*

United States Gypsum Co. Plans to Increase Capital

THE United States Gypsum Co. stockholders will vote on a proposal to increase the capitalization of the company at the annual meeting February 11, for in increase in the common stock from $10,000,000 to $15,000,000, consisting of 750,000 shares of $20 par value.

"This does not mean that any further distribution of stock dividends is contemplated at present," it was announced by Sewell L. Avery, president.

"This increase is proposed merely to restore the deficiency in the unissued stock, in accordance with the established policy of the board of directors to have it available for such corporate purposes as may arise from time to time in the future expansion of the business."—*Wall Street News.*

Missouri Portland Cement Stock Goes to 170

ACCORDING to the *Kansas City Star,* Missouri Portland Cement Co. stock was one of the active features on the St. Louis stock exchange during the past month. This was due to increase in the dividend rate to $2 quarterly. On January 21 the stock jumped 10 points to 170.

Cement Prices Lowered in Washington

SPOKANE and other Washington papers carry news items regarding the drop of cement used in paving on state highways. One article reads:

"The state will save more than 10% on the cost of cement used in paving during the coming biennium. Manufacturers have guaranteed that the cost will not be greater than $2.10 a barrel or 52½ cents a sack, the new price being a reduction of 25 cents from the old quotations. It is understood that in obtaining the new maximum price the state will make some saving on hold-over paving contracts since the cement will be delivered to the job 25 cents a barrel cheaper than the figure offered contractors last summer."

E. J. Armtsrong

E. J. ARMSTRONG, chief engineer of the Erie Steam Shovel Co., died January 21 as the result of an illness with which he had been afflicted for several years. He was born in 1861 and was connected with various manufacturing companies until 1900 when he entered the employ of the Ball Engine Co., which afterward became the Erie Steam Shovel Co. He had a great deal to do with the development of the steam shovel and later became one of the directors of the company. Owing to his long connection with the industry he was widely known.

Pacific Coast Cement Manufacturer Underbids Importers

"COMPETITION of foreign cement and construction material with local production is cutting costs of waterfront development on the San Francisco waterfront," says a signed article by Al S. Peterson, in the *San Francisco Call-Post.*

"According to Frank White, chief engineer of the Board of State Harbor Commissioners, re-entry of foreign cement and other materials from Europe has saved the state better than $70,000 in the cost of pier 52 and the China Basin terminal, now under construction. The engineering department also expects a considerable saving on all future building.

"Recently, when the bids were opened for more than 50,000 bbls. of cement to be used in the new work, the basic price of $2.66 net per bbl. was cut to $2.04 net by one of the local manufacturers. This price was even lower than any submitted by representatives of Norwegian or Belgian importers."

Big Increase in Ohio Hydrates Projected

RUMORS current a year ago that Ohio dolomitic lime manufacturers were not "bullish" on the future of their industry do not seem to be substantiated by recent newspaper reports—such, for example, as the one below, from the *Toledo Blade:*

"The Woodville Lime Products Co., Woodville, Ohio, has let the contracts for another new lime plant there. Construction work on the new plant will start immediately and will progress as fast as the material needed can be procured. The new construction work will be erected along side of the company's old plant and will consist of 12 kilns and a hydrate mill."

To Intervene in Texas Cement Rate Case

THE Interstate Commerce Commission today granted permission to the Trinity Portland Cement Co. to intervene in the case of the Texas Portland Cement Co. against the Arkansas Western Railway Co., in which rates on cement were attacked as unreasonable. The Trinity Portland Cement Co. will be treated as a party to the case with the right to appear and submit testimony.—*New York Wall Street News.*

Indiana Road Commission Saves $123,000 in Cement Contracts

THE state highway commission of Indiana has announced the saving of more than $123,000 on cement for the 1925 paving program, due to early contracting for its 1925 supply of cement, totaling 1,230,212 bbls. Since the signing of the contracts the price of cement has increased 10 cents on the bbl.

The average price obtained by John D. Williams, director of the commission, was $1.75 a barrel, less 10 cents a barrel for cash. the amount of cement contracted for this year is almost double that of last year.

Contracts have been signed with four companies, including the Lehigh, Indiana, Louisville and Universal Cement corporations. Final negotiations have not been completed with other manufacturers, but arrangements have been made to obtain the lower price.—*Indianapolis (Ind.) News.*

Wisconsin Moulding Sand Company Increases Output

TWO hundred and fifty carloads of molding sand, with a value of $14,000, was the 1924 output of the Janesville, Wis., Molding Sand Co., with pits at Leyden, was announced by I. J. Fletcher, manager. This was an increase of 25% over that of 1923. The firm has a registered capital of $20,000.

The company employs five men. Officers are T. W. Nuzum, president; J. R. Nuzum, vice-president; J. F. Pember, treasurer, and A. H. Pember, secretary.—*Janesville (Wis.) Gazette.*

Increase in Lime Rates in Missouri Suspended

THE Missouri public service commission recently ordered suspended, until July 23, increased rates on lime moving in carload lots to points in southern Missouri. The railroads last August announced the increases, which were ordered suspended by the public service commission and the interstate commerce commission pending investigation of the reasonableness of the proposed increase. The new order is to lengthen the period allowed for the investigation.—*Springfield (Mo.) Republican.*

Traffic and Transportation

By EDWIN BROOKER, Consulting Transportation and Traffic Expert
Munsey Building, Washington, D. C.

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning January 26:

Trunk Line Association Docket

12395. Cement. Carloads, minimum weight 50,000 lb., from Security, Md., to Chesapeake Beach Ry. stations Marr, Md., to Marlboro, Md., inclusive, 14 cents per 100 lb. File 29077.

12407. Cement. Carloads, minimum weight 50,000 lb., except when for carrier's convenience a car of less capacity is furnished, the minimum weight will be marked capacity of car, but not less than 40,000 lb. To Danville & Western Railway stations. From Union Bridge, Md., York, Penn. Rates in cents per 2000 lb.:

	Pres.	Pro.
Stokesland, Va., to Oak Hill, Va.	528	589
Berry Hill, Va., to Aiken Summit, Va.	528	589
Boxwood, Va., to Ballast Siding, Va.	528	589
Preston, Va., to Spencer, Va.	568	629
Stella, Va., to Stuart, Va.	568	629

Southwestern Freight Bureau Docket

3486. Cement. To amend Items 3011½A of S. W. L. Trf. 43Q, applying on cement, hydraulic, natural or portland (building cement), carloads, from Kansas producing points to points in the T. & R. in Texas to include Altoona, Cherryvale, Ft. Scott, Mildred and North Altoona, Kan., as origin points on the same basis as the other Kansas Gas Belt points. It is stated that what is desired is to enable shippers at points outlined above to compete on the same basis as other Kansas Gas Belt points.

3553. Sand. To establish specific commodity rates on sand, carloads, minimum weight marked capacity of car, fom Kansas producing points to points in Oklahoma, based on the Oklahoma mileage scale as published in S. W. L. Tariff 55-Series. It is stated that a large bond has been voted for new paving highway to be constructed in Oklahoma and shippers desire the establishment of rates from points in Kansas that will enable them to compete with shippers in Oklahoma.

3554. Gravel. To establish a rate of 5½ cents per 100 lb. on gravel, carloads, minimum weight 80,000 lb., or marked capacity of car if less than 80,000 lb., from Neal Springs, Ark., to Shreveport, La. Shippers request the establishment of an emergency rate pending the decision of the Interstate Commerc Commission in Docket 16002.

Southern Freight Association Docket

18214. Crushed stone. Carloads, from Pacolet and Beverly, S. C., to Jacksonville, Fla., and Brunswick, Ga. Present rates: from Pacolet to Jacksonville, $1.89; to Brunswick, $1.76; from Beverly to Jacksonville, $2.03; to Brunswick, $1.89 per net ton. Proposed rates, from Pacolet to both points, $1.53; from Beverly, $1.67 per net ton. The proposed rates are for the purpose of placing the origins mentioned on a competitive basis.

18235. Cement. It is proposed to establish a temporary line of commodity rates on cement, carloads, pending general revision, from Clinchfield, Ga. (formerly Corren, Ga.), to Southeastern and South Carolina points, also to Southern North Carolina points, in line with existing rates from other Southern producing points. Statement of present and proposed rates, with basis therefor, will be furnished interested parties upon request.

18245. Cement. Carloads, from Chattanooga, Richard City and Nashville, Tenn., to Vienna, Ga. Combination now applies. Proposed: From Chattanooga and Richard City, 17½ cents; Nashville, 21½ cents per 100 lb.; same as present rates to Cordele, Ga.

18278. Cement. Carloads, from Fordwick, Va., to stations on the Rose Hill branch of the Northwestern Railroad to South Carolina. Combination rates now apply. Proposed rate, 24 cents per 100 lb., same as in effect to main line stations between Camden and Sumter, S. C.

18282. Crushed stone. Carloads, from Holton and Stockbridge, Ga., to G. S. & F. Ry. stations. It is proposed to establish rates based on the proposed Georgia joint line scale, reduced 10%, but not higher than present rates, observing the proposed rate of $1.60 per ton to Lake City, Fla., as maximum at stations between Macon, Ga., and Lake City, Fla.

18334. Sand and gravel. It is proposed to cancel rates on the following commodities from and to points named, account of no movement: Sand, carloads, from Spruce Pine, Ala., to Riverton, Ala., $24 per car. Sand, carloads, from Columbus, Miss., to Meridian, Miss., 79 cents per ton. Gravel, carloads, from Columbus, Miss., to Meridian, Miss., 68 cents per ton. Local rates to apply after cancellation.

18342. Crushed stone, crushed marble and ground or pulverized marble. It is proposed to establish on crushed stone, carloads, from Whitestone, Ga., to Battle Creek, Mich., rate of $4.65 per ton, to Flint, Mich., $5.09 per ton and to Saginaw, Mich., $5.27 per ton.

It is also proposed to establish on crushed marble, in bags, carloads, from Tate, Ga., to Youngstown, Garrettsville, East Palestine, Salem, Sebrint, Alliance, Minerva and Carrolton, Ohio, rate of $4.95 per ton; to Crooksville and Roseville, Ohio, rate of $4.14 per ton; to New Castle, Penn., Grafton and Mannington, W. Va., rate of $5.02 per net ton; to Cambridge, Ohio, and Clarksburg, W. Va., rate of $4.64 per ton; to Coshocton, Ohio, rate of $4.52 per ton; to Mt. Clements, Mich., rate of $5.09 per ton, and to Grand Haven, Mich., rate of $5.15 per ton.

18346. Cement. Carloads, from Birmingham and Leeds, Ala., including points in Birmingham group, to Sargents, Ga. Present rate, 15½ cents; proposed, 15 cents per 100 lb., same as rate in effect to points on either side of Sargents from Birmingham and Leeds, Ala.

18394. Cement. It is proposed to establish rates on cement from Nashville to Chattanooga and Richard City, Tenn., Birmingham, Leeds and Ragland, Ala., to L. & N. R. R., Atlanta and Knoxville Division stations, based on the Fourth Section Committee's proposed scale, in lieu of present rates. Below is statement of present and proposed rates (in cents per 100 lb.) to a few representative points:

To	From Chattanooga, Tenn. Richard City, Tenn. Pres.	Pro.	Nashville, Tenn. Pres.	Pro.
Lelano, Tenn.	17	13	30½	16
Oakman, Ga.	15½	14	19½	17
McCallie, Tenn.	12½	13	16½	16
Cambria, Tenn.	18	13	30½	16
Kyle, Ga.	18	14	22	17
Ellijay, Ga.	17½	14	21½	17
Woodstock, Ga.	13½	14	17½	17
Murphy, N. C.	19½	14	34	18
Vestal, Tenn.	13½	13	47	16
Etowah, Tenn.	18	13	30½	16
Louisville, Tenn.	19½	13	28½	16
Croydon, Tenn.	17	14	19½	17
LaFollette, Tenn.	20	15	19½	18
Croley, Ky.	20½	16	....	....
Webster, Tenn.	19½	13	30½	16

To	From Birmingham, Ala Present	Proposed
Lelano, Tenn.	....	....
Oakman, Ga.	....	....
McCallie, Tenn.	....	....
Cambria, Tenn.	....	....
Kyle, Ga.	....	....
Ellijay, Ga.	....	....
Woodstock, Ga.	....	....
Murphy, N. C.	....	....
Vestal, Tenn.	....	....
Etowah, Tenn.	....	....
Louisville, Tenn.	....	....
Croydon, Tenn.	20½	17
LaFollette, Tenn.	20½	18
Croley, Ky.	....	....
Webster, Tenn.	20½	16

18398. Sand and gravel. It is proposed to revise the present mileage rates on sand and gravel, carloads, from Coosada, Oktamulka, Prattville Junction, Jackson's Lake and Montgomery, Ala., to stations on the Southern Alabama Division, Camden Branch and Myrtlewood Branch of the L. & N. R. R. to reflect the same basis as used in connection with rates from and to other points on the L. & N. R. R., except to where present statutory rates on sand will result in a lower figure, in which event the statutory rates will be continued. Statement of present and proposed rates will be furnished interested parties upon request.

Central Freight Association Docket

9961. Crushed stone and screenings, Hillsville District; also New Castle, Penn., to Buffalo and Susquehanna R. R. stations—Wharton, Penn., and south thereof (per net ton):

To	From Hillsville Pres.	Prop.	New Castle Pres.	Prop.
Sagamore, Penn.	$3.10	$1.80	$1.70	$ .....
McCormick, Penn.	3.10	1.70	1.60	.....
Covode, Penn	3.10	1.70	1.60	.....
Winterburn, Penn.	3.30	1.80	.....	1.70
Penfield, Penn.	3.30	1.80	1.70	.....
Weedville, Penn.	3.30	1.85	1.80	1.75
Bennezette, Penn.	3.30	1.85	1.90	1.75
Greene, Penn.	3.30	1.85	1.90	1.75
Sinnemahoning, Penn.	3.30	1.85	1.90	1.75
Wharton, Penn.	3.30	1.85	2.00	1.75

9966. Crushed stone. Greencastle, Ind., to Shattuc, Perrin and Huey, Ill. Present, 18½ cents to Shattuc and 20½ cents to Ferrin and Huey, Ill. Prosposed, $1.26 per net ton.

9973. Sand and gravel. Enterprise, Lancaster and Sugar Grove, Ohio, to Columbus, Ohio. Present, 80 cents per net ton; proposed, 70 cents per net ton.

9989. Sand (blast, engine, foundry, glass, molding or silica). East St. Louis, Ill., to Jeffersonville, Ind. Present, 22 cents; proposed, $2.65 per net ton.

Hearing on Southern Cement Rate Case

HEARING of oral arguments in the case involving the general cement rate structure of the state, took place recently before the Alabama Public Service Commission, the case being taken under advisement.

Shippers' interests were represented by F. E. Paulson, general traffic manager of the Lehigh Portland Cement Company, Allentown, Penn.; E. Miller, Birmingham, traffic manager, National Cement Co.; A. J. Ribe, representing the Southern Cement Co., Birmingham; D. S. Browder, of North Birmingham, representing Phoenix Portland Cement Co.; and B. M. Angell, representing the Gulf States Portland Cement Co., Spocari.

H. L. Walker, commercial counsel of the Southern Railroad, Washington D. C., represented the carriers.—*Montgomery (Ala.) Journal.*

Lower Rates on Alabama Rock Asphalt

THE Alabama Public Service Commission has ordered that railroad rates on asphalt rock shipped from Margerum, Ala., to any and all points in the state shall be lowered to those in force on shipments of other crushed or broken stone materials, according to Alabama local papers. This directly affects Florence and the rest of the Muscle Shoals district inasmuch as it means that this business can be developed, whereas, under the high rate, the mining of this material was almost prohibitive.

Reparations to the extent of $1492.50 will be ordered as a result of this decision of the public service body. This money will be refunded to the Uvalde Paving Co. on 169 cars of asphalt that have been shipped for use in local paving work.

Cement Products

TRADE MARK APPLIED FOR WITH U.S. PATENT OFFICE

Cement Products Manufacturers Discuss Better Graded Aggregates

Proceedings of Annual Convention of the Concrete Products Association at Milwaukee Show Tendency Toward Scientific Methods and Larger Producing Units

THE Concrete Products Association, which is a national organization of manufacturers of cement products took on a new lease of life on January 29, when W. H. Carey, president of the Wisconsin Concrete Products Association was elected president of the national organization by an unanimous vote. Mr. Carey is a products manufacturer of Wisconsin Rapids, Wis., and under his administration the Wisconsin Association has made remarkable progress. About 300 men interested in products manufacture attended the convention at Milwaukee, January 28 to 30, and all left much impressed with the tremendous strides the industry has made in the short space of 12 months.

The other officers elected were as follows: first vice-president, S. I. Crew, Ohio; second vice-president, C. E. Lindsley, New Jersey; treasurer, Jacob Bosch, Illinois. Members of the board of directors are: W. H. Brooks, Alabama; R. E. Johnston, California; J. E. Zahn, Colorado; H. A. Davis, District of Columbia; John Powers, Illinois; Austin Crabbs, Iowa; R. W. Prescott, Masachusetts; William A. Roop, Massachusetts; E. W. Dienhart, Michigan; George Saffert, Minnesota; E. W. Arrasmith, Kansas; A. V. Johnson, Nebraska; C. E. Goodwin, New Jersey; Charles J. McCabe, New York; W. A. Edgerton, North Carolina; George Barriball, Ohio; F. J. Kinzinger, Ontario; F. J. Straub, Pennsylvania, Newton D. Benson, Rhode Island; H. B. Springer, Tennessee; N. A. Eppes, Texas, and W. R. Harris, past president, of Chicago, Ill.

No Longer on the Defensive

No cement products producer could have attended the various sessions of the convention and have failed to be enthused. Sufficient evidence was presented at any one session to convince any reasonable man that cement products can be made superior to any of their competitors in strength, fire resistance, durability and serviceability. Producers now feel that they have been on the defensive long enough. Ammunition is

W. H. Carey of Wisconsin Rapids, Wis., President of the Concrete Products Association

piling up, and capital to use it, and it will soon be used to do a little crowding on the other fellow's preserves.

The time is rapidly approaching when concrete block manufacture will be largely on a big-scale production basis with scientifically controlled methods of manufacture. Already sand, gravel and crushed stone producers are beginning to cater to the especial needs of block manufacturers, and block manufacturers are beginning to have real knowledge of how to use the "fineness modulus" in lowering the cost and increasing the strength and density of their blocks. In other words, there is every reason to believe that scientific and engineering knowledge and experience are going to be used with just as much profit in the cement products industry as in other great manufacturing industries. As one speaker said: "The clay products industries have made several millionaires and the time is approaching when the cement products industry will help to make a few."

Fire Resistance Qualities

N. J. O'Brien, assistant engineer, Underwriters' Laboratories, Chicago, Ill., explained a 100-page report on the fire resistance of hollow concrete building units which has just been issued by the Laboratories.*

Tracing back the history of cement products to find out how they originally got a bad name as a fire-resisting material he found it dated from some tests of blocks made from highly *silicious aggregates*. The recent series of tests led to the following conclusions: "(1) That one-piece 5x8x12 in. or 8x8x16 in. hollow concrete building units, having cement proportions from 1:3 to 1:7 and either air or steam cured, and mixed either dry, damp, or wet consistencies and of fine and coarse aggregates, of limestone, of crushed slag, of crushed cinders, or of sand and calcareous pebbles, when assembled into walls one unit thick and with the usual limitations as to height and unbraced areas, are capable of withstanding standard fire-exposure conditions in excess of 5 hours

*Retardant Report No. 1555: An Investigation of the Effects of Fire Exposure Upon Hollow Concrete Building Units; conducted for American Concrete Institute, Concrete Products Association, Portland Cement Association, Joint Submittors," May, 1924. A copy may be had on application to the Portland Cement Association, 111 West Washington street, Chicago, Ill.

without serious bulging and without spalling or dislodgment, and without permitting passage of flame, radiant heat or smoke through the wall or partition assembly. (2) That unloaded walls or partitions of such units may be classed as 2-hour fire retardants, the determining point in the classification being the time when a temperature of 300 deg. F. is reached on the unexposed side. (3) That important loaded walls of these units may not be classed formally under the standard specifications as better than 15-min. retardants, the critical point being the development of cracks near the exposed face in end shells and in interior webs, the occurrence of this cracking affecting the stability of the wall at least as regards its continued use after the fire exposure conditions are removed. (4) That loaded walls will perform effectively as fire retardants after shell and web cracking occurred while they remain in place.

"Walls composed of these units do not add fuel to fire. From the fire protection point of view their use is to be preferred over walls of combustible materials or of noncombustible materials, the strengths of which are seriously affected by fire temperatures."

Only Fire-Tested Masonry Building Units

The significance of these tests is that they are the *only tests* ever made by the Underwriters' Laboratories on hollow masonry building units. None of concrete's competitors have yet shown a willingness to submit to the same tests, and there is every reason to believe that hollow clay tile, for example, would not show up as well as concrete tile.

The tests represented ordinary good quality blocks. The Underwriters' Laboratories will test and rate blocks of any products manufacturer who is willing to pay the costs involved—probably not over $500. With or without such rating of a local product this report is of great value to the industry in getting proper recognition for concrete building units in city and state building codes and in meeting a most common form of sales resistance.

The most important result of these tests is to open the way for concrete blocks in big building construction, both industrial and commercial, for while concrete blocks have made extensive inroads in the residence and small building field, there has been considerable resistance to the introduction of concrete blocks in factory and commercial building work because of their unknown fire resistance. On the strength of this report the Kansas State Insurance Board has already given concrete blocks the same rating as 8-in. brick walls. Various city building codes have already been revised to give blocks the same rating as clay tile and brick.

Fire Demonstrations

It would seem from the experience of various products manufacturers that an actual demonstration of the fire-resisting qualities of concrete building units is one of the best methods of bringing local building officials into a frame of mind to give concrete products a fair deal. Henry Buchholz, president of the Concrete Building Units Co., Oak Park, Ill., describes such a test at Cicero, Ill., a town of 60,000, on the outskirts of Chicago.

The affair was staged in such a manner that it made "first-page copy" for the local newspapers. Contractors, city officials and architects were invited to witness the demonstration. After the fire had burned for some time a hose stream was turned on it. The blocks were uninjured and were subsequently used in a cellar wall. By having some of the public officials of Oak Park present they were turned into boosters for concrete block, where before they had been much prejudiced against them.

Popular Advertising "Stunts"

PRACTICAL demonstrations that walls built of your blocks will stand a fire test are valuable in convincing skeptical building officials. Guessing contests, with store window displays, help drive home the fact that concrete building blocks are strong.

Surface Treatment

R. F. Havlik, manager, cast-stone department, Loyal Order of Moose, Mooseheart, Ill., spoke of surface treatments for blocks for architectural trim stone. The use of white cement is a great help. The best results were obtained by having the natural aggregates exposed by special treatment. Such treatments include spraying the green block with water, scrubbing with an acid solution, the use of pneumatic tools and carborundum wheels, etc. He considered the acid bath treatment the least expensive, and satisfactory in result. From 5 to 10 minutes was consumed in dipping the blocks in a specially built trough of 1:4 solution of muriatic (hydrochloric) acid and water ($HCL.4H_2O$). Large blocks were easily handled by special tackle.

The problem that remained, Mr. Havlik said, was the prevention of surface checking. He said the cure for checking was the use of a leaner mixture and the elimination of the very fine aggregate. A 1:3 mix containing no aggregate finer than 30-mesh will not check. Crushed granite (Crown Point spar), all through ¼-in. mesh, he had found the most satisfactory surfacing aggregate. Blocks made by the process described had been used for all the buildings at Mooseheart. In closing he told of the training boys received at Mooseheart in cement products craftsmanship and mentioned several graduates who have already assumed prominent places in the industry.

Stucco on Concrete Blocks

A very instructive motion picture of the art of stucco application and finish was exhibited by Frank Gardner, western manager of the technical department of the Atlas Portland Cement Co. The discussion following was largely regarding the prevention of the mortar joints in the masonry showing through light colored stucco. Mr. Gardner recommended a stucco finish not less than 1 in. thick, but the experience of some of those present showed that the thickness of the stucco was of less moment than the *kind of mortar joint.*

When blocks are laid up in portland cement mortar there is no danger of the joints showing through, whether they have been raked or not. The appearance of the joints through the stucco is caused by the difference in "suction" between the block surface and the mortar-joint surface; and when both are of uniform material there is little danger. "Suction" is a term used by masons and is related to the absorption properties of the block. Portland cement stucco on concrete block is therefore an ideal combination.

Advertising Stunts

One of the most interesting sessions of the convention consisted of the relation by various product manufacturers of the methods employed to promote the sale of their commodity. George Leuty, of Beloit, Wis., told how he had had a moving picture made of his block-making operation, and by the payment of $5 per theater, had this film exhibited at moving picture shows. He also had a public controversy with the local building inspector as to the strength of his blocks. By means of a downtown window display and a public guessing contest he developed much popular interest in the controversy. The block was eventually tested by the laboratory of the University of Wisconsin and the building inspector was induced to serve as a member of the jury to award a prize to the contestant whose guess was nearest the strength actually developed by the block.

C. O. Gochnauer, of the Gochnauer Concrete Block Co., Appleton, Wis., explained a newspaper advertising campaign which had been remarkably productive of good results. The advertisements were carried weekly in the local newspaper and each ad was designed to drive home a single point. For example one ad featured strength; another fire-resistance, a third durability, etc. He also tried strength-guessing contests. Reprints of his newspaper advertisements were effectively used in direct-by-mail advertising. Mr. Gochnauer had found that this advertising had made friends in unexpected places—bankers and other people of large influence in industrial and commer-

cial building had been so impressed as to recommend his blocks.

The advertising value of a "certificate of quality," issued by a recognized concrete products association, is another method of getting publicity. This also serves to give the manufacturer renewed faith in his own product. Some manufacturers had facsimiles made of the certificates and used them in advertising matter.

Essentials of a Successful Sales Campaign

Leslie H. Allen, formerly with the cement products bureau of the Portland Cement Association, and now general manager of the Hawthorne Roofing Tile Co., Cicero, Ill., gave a remarkably interesting and inspiring talk on his own experience in promoting sales. Some of the points he brought out were: First, let the market know you have something to sell; second, make them want it. The first step is a market survey to find out who you have got to sell to, and how you are going to sell. His first idea was to go after the architects, but an investigation of the market showed that in ordinary residence building the architect was an almost negligible factor. The professional builder, the contractor and the home owner are the ones that count. Then there is the roofing contractor, or the masonry contractor, who must not be neglected.

Each of the five men to be sold—architect, builder, contractor, owner and sub-contractor—must be reached by a separate avenue of approach, a special appeal. Of these methods of approach the active salesman is the most important, and the one that can have no substitute. Mr. Allen divided his territory into seven districts and has a salesman for each district. This district salesman visits every building job in his district and locates the *key man*. The key man varies with different jobs. He may be the owner, or he may be the contractor, but whoever he is, he must be singled out and as little energy as possible wasted on the men, who in the last analysis have little to say about what goes into the building. These names are all card indexed.

Creating a Favorable Reception for the Salesmen

Having located the key man, the next step is create a favorable reception for the salesman when he makes his calls. Advertisting is the way to accomplish this. Mr. Allen has tried six different methods of advertising: (1) Direct-by-mail circulars; (2) newspaper advertising; (3) packets of matches; (4) "stunts" like the fire demonstration; (5) circular letters; (6) the personality of the salesman himself. Of the various methods of advertising, Mr. Allen considered direct-by-mail material the best. To the mailing list compiled from the names of key men furnished by the salesmen some piece of literature goes at least once a month. The character of the material depends upon the type of key man to be reached—architect, builder, contractor, owner, or sub-contractor, as already mentioned.

A very effective type of circular letter was one printed on handsome colored letterheads—for example, showing an attractive stucco house with the roof in soft natural colors—and the name of the tile company appeared on the letter only in small letters *at the bottom*. In this way men who would ordinarily throw away the material were induced to read, at least, some of it. Each letter is designed to drive home some one thought—beauty, strength, fire-resistance, etc., of the Hawthorne concrete roofing tile. Of course the appeal is designed to fit the particular type of *key man addressed*.

After the receipt of one piece of mail the salesman makes his call, and then he is at least selling something that the man approached knows a little about.

Pointers on Selling

THERE is science in selling. There are definite steps to be taken in developing prospects into buyers. There are "don'ts" you ought to know. Leslie H. Allen's talk, on this page, will give you some good pointers no matter what you have to sell.

Newspaper advertising in big city dailies Mr. Allen considered too expensive and too widespread to produce really tangible results for the amount of money expended. Newspaper advertising, when the manufacturer is in a small city, probably is productive of good results.

"Stunts" in advertising that Mr. Allen had tried consisted of a booth at the "Own Your Home" show, roofing the model home at the show, and putting roofs on other model or demonstration homes built for publicity purposes by newspapers or others. He also cooperated in the fire demonstration at Cicero, described previously. Another form of advertising was a traveling window display which banks in various cities are beginning to welcome and provide windows for. Novelties in the way of Eversharp lead pencils and books of matches, he found, were also effective.

Anticipating Lines of Sales Resistance

In preparing his salesmen for their work much had been done to anticipate the various lines of sales resistance. These were all tabulated and every salesman primed to meet them, but especially warned not to raise points which his prospect had not thought of; nor to bring out such objections by direct questions. Some of the stock objections of course are, permanency of coloring, weight, porosity, etc. Scientific proof, based on actual tests, is provided to answer all these. For positive sales arguments there are quick delivery, higher sales value of the building, natural beauty, etc. Mr. Allen's list of "don'ts" included: Don't talk too much; meet the prospect's objections but don't put any new ones into his mind; don't knock competitive materials, and don't cut prices—have a fixed price and stick to it, for nothing is more demoralizing to salesmen than the liberty to cut prices to get business. His selling expense, including commissions was 20% of his whole cost.

Slag Concrete Brick for Industrial Purposes

How the Birmingham Slag Co., Birmingham, Ala., has built up a big concrete products business was related in detail by W. H. Brooks, sales manager of the brick department of the company. Mr. Brooks in addition to newspaper and circular advertising has used bill boards very effectively. A downtown show room had also proved an effective sales promotion agency.

This company is one of few concrete products manufacturers, apparently, who have made use of building supply dealers in distribution. Recently they are getting away from dealer distribution as unsatisfactory, although they still allow a substantial discount to dealers.

The Birmingham brick has been thoroughly tested and has been accepted by the U. S. Steel Corporation for a variety of uses, including boiler settings, foundry floors, etc. At present 60% of the output of from 800,000 to 1,000,000 brick a month is used for industrial purposes. All this was accomplished in the face of very stiff competition from the clay brick interests. In fact, one of the ways they had made concrete brick popular was by lowering the level of the clay brick prices.

The Birmingham Slag Co. is now experimenting with hollow building tile and stucco and expect a great future in this line. Their common concrete brick sell in a market of $9-10-12 clay brick for $12.50. They figure good concrete brick will sell itself. At present they are using only 60% of the slag sand produced in the making of crushed slag.

Advantages of Thorough Tests

The great value of an accurate knowledge of a man's own product to him as a starting point for selling, was the subject of an address by C. A. Wiepking, testing engineer, engineering department, University of Wisconsin. Scientific tests of concrete blocks include: freezing and thawing, fire resistance, expansion and contraction, absorption, etc. Most of all, such tests are the beginning of scientific manufacture and show the producer how to make the most efficient and effective use of his materials, and consequently reduce the cost of manufacture. Such tests are made for a nominal sum by the testing laboratories of nearly all the state universities.

W. F. Dunlap, of Klau-Van Pietersom-

Dunlap Co., advertising agency, Milwaukee, made a very eloquent address on the possibilities of cooperative advertising through trade associations. F. J. Straub, of the Crozier-Straub Co., New York City, stressed the importance of personality in salesmanship. A neat shop and a production manager as well as a sales manager are essentials to a successful business, he said.

Allan H. Stubbs, of the Mid-West Concrete Products Association, Kansas City, Mo., described the effectiveness of "a model home stunt" in Topeka, linked up with cooperative advertising in the local press. He also tried the fire demonstration stunt with marked success; this happening to be "pulled off" at the time of an insurance convention at Topeka. More than 100 insurance agents were spectators. Mr. Stubbs emphasized the necessity of following up such demonstrations with effective sales work.

The value of a state building code and state inspection in the promotion of legitimate concrete products was discussed by W. C. Muehlstein, building engineer, State Industrial Commission of Wisconsin. He said there were many chances for variation in the quality of concrete products and that the enforcement of some fair requirements was good promotion for the output of legitimate concrete block factories. Under the Wisconsin code no block not approved by the Industrial Commission may be used in a public building or place of employment. The products of 100% of the members of the Wisconsin Concrete Products Association have thus been approved.

Production Problems

E. W. Dienhart, a former engineer of the cement products bureau of the Portland Cement Association, now general manager of the Acme Concrete Products and Gravel Co., Cement City, Mich., made an instructive address on the importance of proper grading of aggregates. He submitted the accompanying table to prove his contention of the economy of using a properly graded aggregate. He said the main hope of the industry in meeting competition lay in the application of scientific knowledge and data—much of it already accumulated but little used.

Every plant, he said, should have a set of testing sieves and know how to use it to find the fineness modulus of the aggregates used. A variation of the fineness modulus between 2.67 and 3.51 showed a 100% difference in the strength of the resultant block. Mr. Dienhart said the strongest possible block was not the goal; that a block of 700 lb. per square inch crushing strength was strong enough, and the real problem was to make this block with the maximum economy.

Boiled down to first principles, raising the fineness modulus merely meant using as much coarse aggregate as possible. He uses ⅜-in. down, and recommends using the coarsest material possible without interfering with the manufacturing process. There is really less trouble with well-tamped coarse material than fine. The freshly molded blocks are not so fragile, and the finished blocks have less absorption.

The average sand and gravel on the market does not make a properly graded aggregate, nor does the average sand and gravel producer ever test his product for the fineness modulus. Since the product must have enough cement for the poorest grading used, there is great need of a uniformity of grading as well as a good grading.

The future of the concrete products industry, Mr. Dienhart said, was in a small profit per unit on a large production. The profit per unit today is more than in most other building material industries.

W. D. M. Allen, secretary of the Illinois Concrete Products Association, elaborated on many of the points made in Mr. Deinhart's talk. A study of plants in Illinois where competition with clay products was keenest showed that the future of the industry was in better aggregates and cheaper products. The coarse aggregate block is preferable from every angle and its manufacture must be increased. The public must be educated away from the idea of a smooth-faced block for general purposes. A block with an initial crushing strength of 700 lb. per square inch was plenty strong enough to compete with clay products, for a concrete block grows stronger with age. From 27 to 28 blocks per sack of cement is possible and feasible, he said.

Mr. Allen said the Portland Cement Association engineers are always ready to go into a plant and actually demonstrate how more blocks may be made per sack of cement, how to correctly proportion the aggregate, water, etc., for the most economical results.

This led to a general discussion of the policy of recommending a 700-lb. block and many and diverse opinions were expressed. Apparently most of the "practical" block makers are afraid of making too poor a block. But as both Messrs. Dienhart and Allen tried to point out, there is no risk of deterioration of the product if its manufacture is *scientifically controlled*.

Study Your Aggregates

IF you are a producer of sand, gravel, crushed stone, or slag, study your operation with a view to making a specially graded aggregate for block manufacture. The time is coming when worth-while block manufacturers will demand such an aggregate.

If you are a block manufacturer buy a set of testing sieves and find out what the fineness modulus of your aggregate is. Raise the fineness modulus by using more coarse material and you will make a better and a cheaper block.

STUDY OF MATERIAL REQUIREMENTS FOR CONCRETE BLOCK MANUFACTURE

Assume: 1—A Uniform Standard of Quality.
2—Cement Cost of $2.60 per barrel.
3—Three Available Aggregates:

	Cost per yd.
A—2.50 fineness modulus	$2.10
B—3.50 fineness modulus	2.35
C—4.50 fineness modulus	2.55

DETAILS OF AGGREGATE COSTS

Based Upon Quotations of Acme Concrete Products and Gravel Co., Cement City, Mich. (Delivered at Toledo.)

Aggregate grading	Cost at pit f.o.b. cars Per ton	Freight and handling Per ton	Total plant cost Per ton	Per yd.	Pr. blk.
A—2.50 F.M.	40c	$1.00	$1.40	$2.10	3.1c
B—3.50 F.M.	55c	1.00	1.55	2.35	3.5c
C—4.50 F.M.	70c	1.00	1.70	2.55	3.8c

TOTAL CEMENT AND AGGREGATE COST USING EACH OF THE THREE AVAILABLE AGGREGATES

Aggregate	Mix	No. block per sack	Cement cost per block	Aggregate cost per block	Total cost cement and aggregate per block	Saving in cost per block
A	1-5	12.5	5.2c	3.1c	8.3c	
B	1-7	17.7	3.7c	3.5c	7.2c	1.1c
C	1-9	22.8	2.9c	3.8c	6.7c	1.6c

Note.—In addition to the cost savings effected by the use of Aggregate C, much lower absorption will result as compared to Aggregates A and B.

Would Have Jail Prisoners Make Cement Blocks

THE *Grand Rapids (Mich.), Herald* says that the county commissioners want the jail prisoners in Grand Rapids employed in making concrete blocks. It is proposed the commissioners buy an old barn and educate a deputy sheriff to supervise the activities of the prisoners in block making. The account goes on to say:

"The committee's objective is to find employment for the prisoners, believing a number of repeaters, disliking a jail life more strenuous than that of being confined to a cell block, would hie to other communities and that the others could be turned to work which would place some revenue in the county treasury."

New Cement Block Plant in Toledo, Ohio

A MODERN cement block plant for the Cement Products and Supply Co., is now under construction in West Toledo, Ohio, to replace the factory recently destroyed by fire. G. R. Huntley, manager of the company, states that the new plant will have a capacity of 1800 blocks per day, and will be equipped with rebuilt and new machinery to manufacture cement block, reinforced concrete tile, cement lawn furniture and vases.

All sizes of reinforced concrete tile, from 12 in. to 54 in., will be made. This product is now being used to replace cast iron pipe in culverts.—*Toledo (Ohio) Blade.*

Tufa for Concrete Aggregate

TUFA, a volcanic rock weighing only 80 lb. to the cubic foot, is being quarried near Phoenix, Ariz. It makes a light weight concrete of sufficient strength for structural purposes.

Seattle Requires 1600-Pound Concrete in Building Units

THE building ordinance recently adopted by the city of Seattle, Wash., is unusual in that it provides that concrete blocks must have a compressive strength of 1600 lb. per square inch. However, the code permits the use of concrete blocks in bearing walls up to four stories in height. The section of the ordinance referred to reads:

"All walls shall be constructed of tile having web and shell thicknesses of not less than 1½ in. In such tile the ratio of open areas to gross tile areas shall not exceed 40%. All such walls shall be laid with full motar beds. The compression strength of hollow concrete tile shall not be less than 1600 lb. per square inch of net cross sectional area.

"The working stress in concrete tile shall not exceed 90 lb. per square inch of net cross sectional area where cement or lime and cement mortar are used. Only those webs which are regularly superimposed upon each other shall be considered as carrying load. No concrete tile shall be used that is not plainly marked with the registered mark of the manufacturer thereof.

"The mark of each manufacturer shall be registered with the Superintendent of Buildings, and it shall be unlawful to manufacture, sell or use any concrete tile that is not properly marked or that is marked with the mark of a manufacturer other than the one who made the tile. Whenever the Superintendent of Buildings has reason to believe that any tile will not attain an ultimate crushing strength of 1600 lb. per square inch he shall prevent the use thereof until the same has been tested. A series of 10 tile selected by the Superintendent of Buildings shall then be tested for compression, and if any show a strength of less than 1600 lb. per square inch the shipment shall be rejected, or an additional series of 10 tests shall be made. Should the second series show all tiles satisfactory, the shipment may be used, but should any fall below the required strength the shipment shall be rejected.

"The cost of all tests required as above shall be borne by the manufacturer."

Montreal Would Forbid Cinder Concrete Blocks

IN reply to oft-repeated demands from Alderman J. N. Drummond, Rosemount, Montreal, Que., the city executive announced that they would have a new by-law ready in some ten days' time, which will control effectively the manufacture, sale and use of cement blocks.

Alderman Drummond states: "That the practice has become too common of using cinders in the make-up of these blocks, which are used in walls of houses. The cinder block is highly combustible, weak, and not of sufficient quality to be used in any building." He even would cite "examples to prove that in many cases fires have been traced to their use. It is decided to enforce strict supervision over this item of construction and forbid the use of cinders or ashes in the blocks."

Cast Stone Company Will Enlarge Plant

AN expansion of the present plant to take care of the greatly increased business established during the past year is planned by the Schenectady Cast Stone Co. A total of 3500 blocks a day is now being turned out.

Directors elected at a meeting recently are: L. Rodman Nichols, W. A. Stearns, Thomas Keigher, Frank Stein, James Morey, Herbert Russ, Charles Sullivan, Dr. Maus Stearns and J. N. Van Kamerik. Tellers are William O. Carter and John V. Jeffers.

The following officers were elected: L. Rodman Nichols, president; W. A. Stearns, vice president; Dr. Maus Stearns, treasurer and John N. Van Kamerik, secretary.—*Schenectady (N. Y.) Gazette.*

The (British) Concrete Year Book

THE Concrete Year Book, 1925, edited by Oscar Faber and H. L. Childe, the latter the editor of Concrete Publications (London), is a book of 400 pages of which 130 are given to concrete and the remainder to a directory of engineers, contractors and manufacturers and dealers. This is the third issue of the series. A great deal of the material is taken from American sources and properly credited, something that one does not always note in foreign publications. Much attention is given to concrete design and there are some excellent tables and illustrations in this section.

Prof. Abrams' method of designing concrete mixes is not mentioned in the text but a note says that it was printed in the 1924 edition. The theory of concrete making given as standard is the voids theory. However the effect of using excess water is explained and there is a table which shows how much water may be used with different mixes from 1-4-8 to 1-1-2, a rough way of getting at the matter. The slump test is described and illustrated, and the proper slump to use with different sorts of work is given.

In reviewing the progress of the year stress is laid upon the introduction of the new quick hardening portland cement and a comparison is made with high alumina cements. The latter is now being made in Great Britain, where it is not protected by patents, but it is expensive as the bauxite has to be imported. The book is published by Concrete Publications, Ltd. 29 Dartmouth St., Westminister, London, S. W. I., and the price is 2s 6d.

American Concrete Institute Program

THE American Concrete Institute will hold its annual meeting at the Drake Hotel in Chicago, February 24 to 27.

The greater part of the program will be devoted to the design and placing of concrete, but there will be many papers presented which will be of especial interest to aggregate producers and others interested in the rock products industries. Cement products will receive a great deal of attention at this meeting. There will be a committee report and discussion upon the following points in connection with cement products manufacture:

1. The economic range of mixes for light building tile;
2. Effect of method of mixing on the strength and density of concrete in light building tile;
3. Effect of retempering on the strength and density of light building tile;
4. The effect of various curing conditions on the strength of building block.

Several series of tests have been made to learn these things and the session will really be a school to teach how to gain a real commercial advantage in making units at a lower cost by knowing what mixes and methods to use with available materials.

A paper that will especially interest aggregate producers is "Proportioning Concrete Materials with Special Reference to Highway Construction," by G. W. Hutchinson, who did so much research work on aggregates for highway construction when he was assistant state highway engineer of North Carolina.

Government May Build Oil Shale Plant in Colorado

AN appropriation of $90,000 for construction of an oil shale reduction plant on the naval reserve in the Grand Valley district is expected to be approved by congress.

A committee of government experts visited the section recently and surveyed the territory preparatory to selecting a site for the proposed plant. The members of the surveying party indicated that there was little doubt that the bill would be passed.

While the appropriation will only cover initial construction on the plant, it is thought that additional funds will be forthcoming as needed.—*Albuquerque (N. M.) Tribune.*

Making Artificial Magnesite

THE waste liquors of the German potash industry contain large quantities of magnesium and their disposal has long presented a problem. Recent experiments show there is a possibility of precipitating the magnesium as a chloride, treating this to obtain magnesia and sintering with iron oxide to produce an artificial magnesite.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.			1.30 per net ton all sizes			
Chaumont, N. Y.	1.00	.....	1.75	1.50	1.50	1.50
Eastern Pennsylvania	1.35	1.35	1.45	1.35	1.35	1.35
Munns, N. Y.	1.00	1.40	1.40	1.30	1.30	.....
Northern New Jersey	.....	.....	1.60	.....	.....	.....
Prospect, N. Y.	1.00	1.40	1.40	1.30	1.30	.....
Walford, Penn.	.....	.....	1.35	1.50	1.60	1.60
Watertown, N. Y.	1.00	.....	1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL						
Alton, Ill.	1.75	.....	1.75	.....	.....	.....
Bloomville, Middlepoint. Dunkirk, Bellevue, Waterville, No. Baltimore, Holland, Kenton, New Paris, Ohio: Monroe, Mich.; Huntington, Bluffton, Ind.	1.00	1.10	1.10	1.10	1.00	1.00
Buffalo, Iowa	1.20	.....	1.45	1.25	1.30	1.30
Chicago, Ill.	.80	1.00	1.00	1.00	1.00	1.00
Columbia, Krause, Valmeyer, Ill.	1.15	1.20	1.20	1.20	1.10	1.10
Cypress, Ill.	1.20	1.20	1.15	1.20	1.25	1.25
Dundas, Ont.	.75	1.00	1.00	.90	.90	.90
Greencastle, Ind.	1.25	1.25	1.15	1.05	.95	.95
Lannon, Wis.	.80	1.00	1.00	.90	.90	.90
Linwood, Iowa	1.00	1.25	1.25	1.05	1.05	1.15
Northern New Jersey	1.30	.....	1.80	1.60	1.40	.....
St. Vincent de Paul, P. Q.	.90	1.25@1.45	1.00	.90	.90	.....
Stone City, Iowa	.75	.....	1.20†	1.10	1.05	.....
Waukesha, Wis.	.90	.90	.90	.90	.90	.90
Wisconsin Points	.50@1.50	.....	1.10	1.00	1.00	.....
Youngstown, Ohio	.....	.....	.....	1.50	1.60	1.60
SOUTHERN:						
Alderson, W. Va.	.60	1.60	1.60	1.50	1.40	.....
Bridgeport and Chico, Texas	1.00	1.25@1.35	1.25	1.25	1.15	1.10
Cartersville, Ga.	1.50	1.65	1.65	1.35	1.35	1.25
El Paso, Texas	1.00	1.00	1.00	1.00	.....	.....
Ft. Springs, W. Va.	.60	1.60	1.60	1.50	1.40	.....
Graysville, Ga.	1.00	.....	.85@1.10	.85@1.00	.85@1.00	.....
WESTERN:						
Atchison, Kans.	.50	.....	2.00	2.00	2.00	1.60‖@1.80
Blue Spr'gs & Wymore, Neb.	.20	1.45	1.45	1.35@1.40	1.25@1.30	1.20
Cape Girardeau, Mo.	1.25	.....	1.25	1.25	1.00	.....
Kansas City, Mo.	1.00	1.65	1.65	1.65	1.65	1.65

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.60	1.70	1.45	1.20	1.05	.....
Duluth, Minn.	1.00	2.25	1.75	1.50	1.30	1.30
Dwight, Calif.	1.75	1.75	1.75	1.75	1.75	.....
Eastern Maryland	1.10	1.75	1.70	1.60	1.50	1.50
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.75	1.70	1.60	1.50	1.50
Minneapolis, Minn.	1.25	.....	2.25	2.00	1.75	.....
Northern New Jersey	1.60	2.20	2.00	1.60	1.60	.....
Oakland and El Cerrito, Calif.	1.75	1.75	1.75	1.75	1.75	.....
San Diego, Calif.	.50@ .75	1.80@1.90	1.60@1.80	1.35@1.55	1.35@1.55	1.25@1.45
Springfield, N. J.	2.00	2.10	2.20	1.80	.....	.....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	1.10

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley and Red Granite, Wis.	1.60	1.70	1.60	1.50	1.40	.....
Columbia, S. C.—Granite	1.50b	2.00	2.00	1.75	1.75	.....
Eastern Penn.—Sandstone	1.30	1.70	1.65	1.45	1.45	1.30
Eastern Penn.—Quartzite	1.20	1.35	1.20	1.20	1.20	1.20
Lithonia, Ga.—Granite	.75(c)	1.50	1.50	1.25	1.10	.....
Lohrville, Wis.	1.65	1.65@1.70	.....	1.45	1.50	.....
Middlebrook, Mo.—Granite	3.00@3.50	.....	2.00@2.25	2.00@2.25	.....	1.25@2.00
Northern New Jersey (Basalt)	150	2.00	1.80	1.40	1.40	.....
Richmond, Calif. (Basalt)	.75*	.....	1.50*	1.50*	1.50*	.....

*Cubic yd. †1 in. and less. ‖Rip rap per ton; (b) dust out; (c) sand.

Agricultural Limestone

(Pulverized)

Alton, Ill. — Analysis, 98% $CaCO_3$; 90% thru 100 mesh 6.00

Asheville, N. C. — Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk 2.75

Branchton, Penn. — 100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers) 5.00

Cartersville, Ga. — Analysis, 58% $CaCO_3$, 38% $MgCO_3$; pulverized 2.25
50% thru 50 mesh 1.50

Chaumont, N. Y. — Pulverized limestone, bags, 4.00; bulk 2.50

Colton, Calif.—Analysis, 95% $CaCO_3$, 3% $MgCO_3$—all thru 20 mesh—bulk 4.00

Dundas, Ont., Can.—Analysis, 53.80% $CaCO_3$, 43.31% $MgCO_3$; 35% thru 100 mesh, 50% thru 50 mesh, 100% thru 10 mesh; bags, 4.75; bulk 3.00

Hillsville, Penn. — Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$, 75% thru 100 mesh; sacks, $5.00; bulk 3.50

Jamesville, N. Y.—Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.00; bulk 2.50

Knoxville, Tenn.—80% thru 100 mesh, bags, 3.95; bulk 2.70

Linville Falls, N. C.—Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk 2.75

Marblehead, Ohio — Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 80 lb. paper sacks, 5.10; bulk 3.60

Marion, Va. — Analysis, 90% $CaCO_3$, 2% $MgCO_3$; 42.5% thru 100 mesh, 11.3% thru 80, 20.2% thru 60, 22.8% thru 40, 3.2% thru 20 and under or 75% thru 40 mesh; pulverized, per ton 2.00

Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 90% thru 100 mesh 4.00

Mountville, Va.—Analysis 76.60% $CaCO_3$, 22.83% $MgCO_3$; 50% thru 100 mesh, 100% thru 20 mesh—125-lb. hemp bags 5.00

Osborne, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers) 5.00

Piqua, Ohio—Total neutralizing power 95.3%; 100% thru 10, 60% thru 50; 50% thru 100 ..... 2.10@ 2.25
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.00; bulk 3.50
100% thru 100, 85% thru 200; bags, 7.00; bulk 5.50

Rockdale, Mass. — Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk 3.25

Watertown, N. Y.—Analysis, 96-99% $CaCO_3$; bags, 4.00; bulk 2.50

West Stockbridge, Mass. — Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk 3.25

Agricultural Limestone

(Crushed)

Alderson, W. Va. — Analysis, 90% $CaCO_3$; 50% thru 100 mesh 1.50

Alton, Ill.—Analysis 98% $CACO_3$; 50% thru 4 mesh 3.50

Bedford, Ind.—Analysis, 98½% $CaCO_3$, ½% $MgCO_3$; 90% thru 10 mesh 1.50

Bettendorf, Iowa — 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh 1.50

Blackwater, Mo.—77% $CaCO_3$; 100% thru 8 mesh, 25% thru 100 mesh 1.00

Bridgeport and Chico, Texas—Analysis, 94% $CaCO_3$, 2% $MgCO_3$; 100% thru 10 mesh 1.75
50% thru 4 mesh 1.50

Cape Girardeau, Mo.—Analysis, 93.5% $CaCO_3$, 3.5% $MgCO_3$; 50% thru 100 mesh 1.50

(Continued on next page)

Agricultural Limestone

(Continued from preceding page)

Chicago, Ill.—50% thru 100 mesh; 90% thru 4 mesh	.80
Columbia, Krause, Valmeyer, Ill.—Analysis, 90% $CaCO_3$; 90% thru 4 mesh	1.15
Cypress, Ill.—50% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh	1.15
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh	1.50
Kansas City, Mo.—50% thru 100 mesh	1.25
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% through 10 mesh; 46% through 60 mesh	2.00
Screenings (¼ in. to dust)	1.00
Marblehead, Ohio.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$, 32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% thru 4 mesh (meal) bulk	1.60
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 90% thru 50 mesh	1.85
Middlepoint, Bellevue, Kenton, Ohio; Monroe, Mich.; Huntington and Bluffton, Ind.—Analysis, 52% $CaCO_3$, 44% $MgCO_3$; meal, 100% thru 4 mesh, 35% thru 100 mesh	.75@ 1.50
Milltown, Ind.—Analysis, 94.41% $CaCO_3$, 2.95% $MgCO_3$; 30.8% thru 100 mesh .38% thru 50 mesh	1.45@ 1.60
Moline, Ill.—97% $CaCO_3$, 2% $MgCO_3$—50% thru 100 mesh; 50% thru 4 mesh	1.50
Pixley, Mo.—Analysis, 96% $CACO_3$; 50% thru 50 mesh	1.25
50% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh	1.65
River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk	.80@ 1.40
Stone City, Iowa.—Analysis, 98% $CaCO_3$; 50% thru 50 mesh	.75
Waukesha, Wis.—Test, 107.38% bone dry, 100% thru 10 mesh; bags, 2.85; bulk	2.10

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 4.50; bulk	3.00
Waukesha, Wis.—Bulk	3.50

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton.

Glass Sand:	
Berkeley Springs, W. Va.	2.00@ 2.50
Cedarville and S. Vineland, N. J.—Damp	1.75
Dry	2.25
Cheshire, Mass: 6.00 to 7.00 per ton; bbl.	2.50
Columbus, Ohio	1.25@ 1.50
Estill Springs and Sewanee, Tenn.	1.50
Grays Summit and Klondike, Mo.	2.00
Los Angeles, Calif.—Washed	5.00
Mapleton Depot, Penn.	2.00@ 2.25
Massillon, Ohio	3.00
Ohlton, Ohio	2.50
Ottawa, Ill.—Chemical and mesh guaranteed	1.50
At market	1.00
Pacific, Mo.	2.25@ 3.00
Pittsburgh, Penn.—Dry	4.00
Damp	3.00
Red Wing, Minn.: Bank run	1.50
Ridgway, Penn.	2.50
Rockwood, Mich.	2.75@ 3.25
Round Top, Md.	2.25
San Francisco, Calif.	3.00@ 3.50
St. Louis, Mo.	2.00
Sewanee, Tenn.	1.50
Thayers, Penn.	2.50
Utica, Ill.	1.00@ 1.40
Zanesville, Ohio	2.50
Miscellaneous Sands:	
Aetna, Ind.: Core, Box cars, net, .35; open-top cars	.30
Albany, N. Y.: Molding fine, brass molding	2.75
Molding coarse	2.75
Sand blast	4.50
Arenzville and Tamalco, Ill.: Core	1.00
Molding coarse	1.50
Molding fine	1.50@ 1.75
Brass molding	2.00
Beach City, Ohio: Fine core, washed and screened	1.50
Furnace bottom; steel molding (fine	

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, f. o. b. producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Ambridge & So. H'g'ts, Penn.	1.25	1.25	1.15	.85	.85	.85
Buffalo, N. Y.	1.10	.95			.85	
Farmingdale, N. J.	.83	.73	1.20	1.20	1.35	
Leeds Jct., Maine		.50	1.75		1.35	1.25
Machias Jct., N. Y.		.75	.75	.75	.75	.75
Montoursville, Penn.	1.00	1.10	1.00	1.00	1.00	.90
Northern New Jersey		.40@ .80	1.25	1.50	1.50	
Pittsburgh, Penn., and vicinity	1.25	1.25	1.05	1.05	.85	.85
Shining Point, Penn.			1.00	1.00	1.00	1.00
Washington, D. C.—Rewashed, river	.85	.85	1.70	1.50	1.30	1.30
CENTRAL:						
Attica, Ind.	.75	.75	.75	.75	.75	.75
Columbus, Ohio	.75	.75@1.00	.75@1.00	.75@1.00	.75@1.00	.75
Covington, Ind.	.75	.75	.75	.75	.75	.75
Des Moines, Iowa	.50	.30	1.50	1.50	1.50	1.50
Eau Claire, Wis.	.40	.40	.85@1.25			.85
Elkhart Lake, Wis.	.60	.60	.80	.80	.80	.80
Ft. Dodge, Iowa	1.00		2.05	2.05	2.05	
Ft. Worth, Texas	2.00	2.00	2.00	2.00	2.00	2.00
Grand Rapids, Mich.		.60		.90	.80	.80
Hamilton, Ohio		1.00			1.00	
Hersey, Mich.		.50				.70
Indianapolis, Ind.	.60	.60		.90	.75@1.00	.75@1.00
Janesville, Wis.		.65@ .75			.65@ .75	
Mason City, Iowa	.45@ .55	.45@ .55	1.35@1.45	1.45@1.55	1.40@1.50	1.35@1.45
Mankato, Minn.		.40	1.25		1.25	
Milwaukee, Wis.		1.01	1.21	1.21	1.21	1.21
Minneapolis, Minn.*	.35	.35	1.35	1.25	1.25	1.25
Northern New Jersey	.45@ .50	.45@ .50		1.25	1.25	
Palestine, Ill.	.75	.75	.75	.75	.75	.75
St. Louis, Mo., f. o. b. cars	1.18	1.45	1.65§	1.45		1.45§
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
Summit Grove, Ind.	.75	.75	.75	.75	.75	.75
Terre Haute, Ind.	.75	.60	.90	.90	.90	.85
Wolcottville, Ind.	.75	.75	.75	.75	.75	.75
Waukesha, Wis.	.40	.40	.65	.65	.65	.65
Winona, Minn.	.40	.40	1.25	1.10	1.00	1.00
Yorkville, Sheridan, Oregon, Moronts, Ill.			Average .40@.60			
Zanesville, Ohio	.70	.60	.60	.60	.90	
SOUTHERN:						
Brookhaven, Miss., Roseland La.	1.75*	.70	2.25	1.50	1.25	
Charleston, W. Va.	All sand 1.40 f.o.b. cars.			All gravel 1.50 f.o.b. cars.		
Chehaw, Ala.	1.24	1.24		1.90	1.90	1.90
Estill Sp'gs & Sewanee, Tenn.	1.00	.90	1.00	1.00		.85
Knoxville, Tenn.	1.00	1.00	1.20	1.20	1.20	1.20
Macon, Ga.	.50	.50		.55	.60	
New Martinsville, W. Va.		.90		1.30		.90
Smithville, Texas	1.00	1.00	1.00	1.00	1.00	1.00
WESTERN:						
Baldwin Park, Calif.		.25@ .35			.50@ .75	
Crushed rock	.90@1.10	.60@ .90	.60@ .90	.60@ .90	.60@ .90	
Kansas City, Mo.	Kaw river sand .75 per ton f.o.b. plants					
Los Angeles, Calif.		.40	.50	.65	.60	.60
Pueblo, Colo.	1.10*	.90*		1.60*		1.50*
San Diego, Calif.	.50	.50	1.20	1.20	1.00	1.00
Seattle, Wash. (bunkers)	1.50*	1.50*	1.50*	1.50*	1.50*	1.50*

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Boonville, N. Y.	.60@ .80		.55@ .75			1.00
Brookhaven, Miss., Rosel'd, La.	Road gravel, ballast gravel .60 a ton					
Chehaw, Ala.	.90@1.00					
Des Moines, Iowa	Washed, .50; unwashed, .40 (not screened)					
Dudley, Ky.	1.15	1.10		.95		
East Hartford, Conn.	Sand, .65 per cu. yd.					
Elkhart Lake, Wis.	.50					
Gainesville, Texas		.95				.55
Grand Rapids, Mich.				.55		
Hamilton, Ohio					.67	
Hersey, Mich.				.55		
Indianapolis, Ind.	Mixed gravel for concrete work, .65					
Lindsay, Texas						.55
Macon, Ga.	.35					
Mankato, Minn.	Pit run gravel, .50					
Moline, Ill. (b)	.60	.60	Concrete gravel, 50% G., 50% S., 1.00			
Montezuma, Ind.						.60
St. Louis, Mo.	Mine run gravel 1.55 per ton					
Shining Point, Penn.	Concrete sand, 1.10 ton					
Smithville, Texas	.50	.50	.50	.50	.50	.50
Summit Grove, Ind.	.50	.50	.50	.50	.50	.50
Waukesha, Wis.	.60	.60	.60	.60	.60	.60
Winona, Minn.	.60	.60	.60	.60	.60	.60
York, Penn.	1.10	1.00				
Zanesville, Ohio		.60				

*Cubic yd.; (a) ¾ in. and less; (b) river run.

Miscellaneous Sands

(Continued from preceding page)

and coarse) washed and screened		2.00
Traction		1.75
Cheshire, Mass.—Furnace lining, molding fine and coarse		5.00
Sand blast	5.00@	8.00
Stone sawing		6.00
Columbus, Ohio:		
Core	.30@	.50
Furnace lining, molding coarse	2.00@	2.25
Molding fine	2.50@	2.75
Sand blast	4.00@	4.50
Stone sawing		1.50
Traction	.50@	.75
Brass molding	2.50@	3.00
Dresden, Ohio:		
Core	1.25@	1.50
Molding fine	1.50@	1.75
Molding coarse		1.50
Traction		1.25
Brass molding		1.75
Dunbar, Penn.:		
Traction (damp)		2.00
Eau Claire, Wis.:		
Sand blast	3.00@	3.25
Elco, Ill.:		
Ground silica per ton in carloads	20.00@	31.00
Estill Springs and Sewanee, Tenn:		
Molding fine and coarse, brass molding		1.25
Roofing sand, sand blast, traction		1.50
Franklin, Penn.:		
Core		2.00
Molding coarse and fine		1.75
Grays Summit, Mo.:		
Molding fine	1.75@	2.00
Joliet, Ill.:		
No. 2 molding sand; also loam for luting purposes and open-hearth work	.65@	.85
Klondike, Mo.:		
Molding fine	1.75@	2.00
Mapleton Depot, Penn.:		
Molding fine, traction		2.00
Massillon, Ohio:		
Molding fine, coarse, furnace lining core and traction		2.50
Montoursville, Penn.:		
Core	1.25@	1.35
Traction		1.00
Brass molding		1.50
New Lexington, Ohio:		
Molding fine		2.75
Molding coarse		2.25
Ohlton, Ohio:		
Core, furnace lining, molding fine and coarse, all green		2.00
Roofing sand, sand blast, stone sawing traction, all green		1.85
Add 50c a ton for green sand dried.		
Oceanside, Calif.:		
Roofing sand (stucco)	3.00@	3.40
Ottawa, Ill.:		
Crude silica sand	1.00@	1.25
Core, furnace lining		1.25
Roofing sand, brass molding	1.25@	2.50
Sand blast, stone sawing		4.00
Traction		1.00
Pacific, Mo.:		
Core, furnace lining	1.00@	1.25
Molding fine	.90@	1.00
Stone sawing	1.00@	1.75
Molding coarse	.85@	1.00
Red Wing, Minn.:		
Core, furnace lining, stone sawing		1.50
Molding fine and coarse, traction		1.25
Sand blast		3.50
Filter sand		3.75
Ridgway, Penn.:		
Core		2.00
Furnace lining, molding fine, molding coarse		1.25
Traction		2.25
Round Top, Md.:		
Core		1.60
Traction, damp		1.75
Roofing sand		2.25
St. Louis, Mo.:		
Core	1.00@	1.75
Furnace lining		1.50
Molding fine	1.50@	2.50

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y.	2.35	1.35	1.35	1.35	1.35	1.35	1.35
E. Canaan, Conn.	3.00	1.00	2.25	1.25	1.25	1.15	1.15
Eastern Penn. and Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Reading, Pa.	2.50	1.00	2.50*	1.25			
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	2.05	1.45		1.45		1.45	1.45
Jackson, Ohio		1.05		1.30	1.05	1.30	1.30
Youngst'n, O., dist.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.		1.55		1.55	1.55	1.55	1.55
Ensley and Alabama City, Ala.	2.05	.80	1.25	1.15	.90	.90	.80
Longdale, Goshen, Glen Wilton, Roanoke, Ruesens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15

*Clean.

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.			12.00					2.20
Buffalo, N. Y.				12.00				
Lime Ridge, Penn.							5.00a	
Williamsport, Penn.			10.00				6.00	
York, Penn.		11.50	10.50	11.50			8.00	1.65i
CENTRAL:								
Cold Springs, Ohio		9.00	9.00		9.00	11.00		
Delaware, Ohio	12.50	10.00	9.00				9.00	1.50
Gibsonburg, Ohio	12.50	10.00	10.00		9.00		9.00	
Huntington, Ind.	12.50	10.00	9.00				9.00	
Luckey, Ohio (f)	12.50							
Marblehead, Ohio		10.00	12.00				9.00	1.50j
Marion, Ohio		10.00	9.00				9.00	1.50j
Mitchell, Ind.		12.00	12.00	12.00	11.00		10.00	1.70e
Tiffin, Ohio		10.00						
White Rock, Ohio	12.50				9.00	11.00	9.00	
Woodville, Ohio	12.50†	9.00†	8.50†		9.00	10.50	8.00	1.60
SOUTHERN:								
Erin, Tenn.							7.80	1.25
El Paso, Texas	23.50						10.50	1.75
Graystone & Wilmay, Ala.	12.50	11.00		11.00			8.50	1.50
Karo, Va.		10.00	9.00				7.00g	1.65h
Knoxville, Tenn.	20.00	11.00		11.00		1.35	8.50	1.50
Varnons, Ala. (f)	11.00p	11.00p			9.00	.90	8.50q	1.50r
Zuber and Ocala, Fla.	14.00	12.00	10.00				12.00	1.70
WESTERN:								
Kirtland, N. M.							15.00	
San Francisco, Calif.	22.00	22.00	15.00	22.00			14.50n	2.50o
Tehachapi, Calif.							16.20	

†50-lb. paper bags; (a) run of kilns; (c) wooden, steel 1.70; (d) wood; (e) wood bbl., $2.20 drum in steel; (f) dealers' prices; (g) to 9.50; (h) to 1.75; (i) 200 lb. bbl.; 2.65, 300 lb. bbl.; (j) wood, steel, 1.70; (l) bags; (m) finishing lime, 2.50 common; (n) common lime; (o) high calcium; (p) to 11.00; (q) to 8.50; (r) to 1.50.

Miscellaneous Sands

(Continued)

Molding coarse	1.25@	1.75
Roofing sand		1.75
Sand blast	3.50@	4.50
Stone sawing	1.25@	2.25
Traction		1.25
Brass molding	2.00@	3.00
San Francisco, Calif.: (Washed and dried)—Core, molding fine, roofing sand and brass molding	3.00@	3.50
San Francisco, Calif. (Direct from Pit)		
Furnace lining, molding coarse, sand blast		3.60
Stone sawing, traction		2.30
Sewanee, Tenn.:		
Molding fine and coarse, roofing sand, sand blast, stone sawing, traction, brass molding		1.25
Tamms, Ill.:		
Ground silica per ton in carloads	20.00@	31.00
Thayers, Penn.:		
Core		2.00
Molding fine and coarse		1.25
Traction		2.25
Utica, Ill.:		
Furnace lining	.60@	1.40
Molding fine	1.00@	1.40
Molding coarse	.60@	1.40
Utica, Penn.:		
Core, molding fine, brass molding		2.00
Molding coarse		1.75
Warwick, Ohio.:		
Core, molding coarse (green) 2.00; (dry) 2.50; traction		2.50
Zanesville, Ohio:		
Sand blast, core, traction	2.00@	3.00
Furnace lining		2.25
Molding fine and coarse; brass molding	2.00@	2.25

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Baltimore, Md.:		
Crude talc (mine run)	3.00@	4.00
Ground talc (20-50 mesh), bags		10.00
Cubes		55.00
Blanks (per lb.)		.08
Pencils and steel workers' crayons, per gross		1.25
Chatsworth, Ga.:		
Crude (for grinding)		6.00
Ground (150-200 mesh) 200 lb. bags		10.00
Pencils and steel workers crayons	1.50@	2.50
Chester, Vt.:		
Ground (20-70 mesh)	7.00@	8.00
Ground (150-200 mesh)	9.00@	10.50
(Bags extra, returnable)		
E. Granville, Rochester, Johnson, Waterbury, Vt.:		
Ground talc (20-50 mesh) bags	7.00@	10.00
Ground talc (150-200 mesh) bags	10.00@	25.00
Pencils and steel workers' crayons, per gross	.75@	2.00
Emeryville, N. Y.:		
(Double air floated) including bags; 325 mesh (50 lb. paper, 100 & 200 lb. burlap bags)		14.75
Hailesboro, N. Y.:		
Ground (150-200 mesh) bags		18.00
Henry, Va.:		
Crude talc (mine run) per 2000-lb. ton	2.75@	3.50
Ground (150-200 mesh), bags	9.00@	14.00
Joliet, Ill.		
Ground (200 mesh), bags		30.00
Marshall, N. C.:		
Crude	4.00@	8.00
Ground (20-50 mesh), bags extra	6.50@	8.50
Ground (150-200 mesh), bags	8.00@	12.00
Natural Bridge, N. Y.:		
Ground talc (300-325 mesh), 200-lb. bags		13.50
50-lb. bags		14.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Gordonsburg, Tenn.—B.P.L. 68-72%..	4.00@	4.50
Mt. Pleasant, Tenn.—B.P.L. 72%	5.00@	5.50
13% phosphoric acid, 95% thru 100 mesh	5.50@	6.00
75% hand mined		6.50
75% (free of fines for furnace use)		6.75
75% max. 5½% I and A	6.50@	7.00
78% max. 4½% I and A		8.00
75/78 B.P.L.	6.50@	8.50
Tennessee—F. O. B. mines, gross ton, unground Tenn. brown rock, 72% min. B.P.L.		5.50
Twomey, Tenn.—B.P.L. 65%, 2000 lb.	7.00@	8.00

Ground Rock

(2000 lb.)

Centerville, Tenn.—B.P.L. 65%		7.00
Gordonsburg, Tenn.—B.P.L. 68-72%..	4.00@	5.00
Mt. Pleasant, Tenn. — B.P.L. 65% 95% thru 100 mesh	6.50@	7.00
Twomey, Tenn.—B.P.L. 65%	7.00@	8.00

(Continued on next page)

Roofing Slate

The following prices are per square (100 sq. ft.) for Pennsylvania Blue-Clay Roofing Slate, f. o. b. cars quarries:

Sizes	Genuine Bangor, Washington Big Bed, Franklin Big Bed	Genuine Albion	Slatington Small Bed	Genuine Bangor Ribbon
24x12, 24x14	10.20	10.00	8.10	7.80
22x12	10.80	10.00	8.40	8.75
22x11	10.80	10.50	8.40	8.75
20x12	12.60	10.50	8.70	8.75
20x10, 18x10, 18x9, 18x12	12.60	11.00	8.70	8.75
16x10, 16x9, 16x8, 16x12	12.60	11.00	8.40	8.75
14x10	11.10	11.00	8.10	7.80
14x8	11.10	10.50	8.10	7.80
14x7 to 12x6	9.30	10.50	7.50	7.80
	Mediums	Mediums	Mediums	Mediums
24x12	$ 8.10	$8.10	$7.20	$5.75
22x11	8.40	8.40	7.50	5.75
Other sizes	8.70	8.70	7.80	5.75

For less than carload lots of 20 squares or under, 10% additional charge will be made.

(Continued from preceding page)

Florida Phosphate

(Raw Land Pebble)

Per Ton

Florida—F. O. B. mines, gross ton, 68/66% B.P.L., Basis 68%	2.25
70% min. B.P.L., Basis 70%	2.50
72% min. B.P.L., Basis 72%	2.75
75/74% B.P.L., Basis 75%	3.75

Fluorspar

Fluorspar—80% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	19.00
Fluorspar—85% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	20.00
Fluorspar, foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Philadelphia, duty paid, per gross ton	18.00

Special Aggregates

Prices are per ton f. o. b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco chips
Barton, Wis., f.o.b. cars		10.50
Chicago, Ill.—Stucco chips, in sacks f.o.b. quarries		17.50
Crown Point, N. Y.—Mica Spar		7.00@ 8.00
Easton, Penn. — Light and dark granite	20.00	*18.00
Haddam, Conn. — Felstone buff	12.00	12.00
Harrisonburg, Va.—Blk marble (crushed, in bags	12.50	12.50
Ingomar, Ohio (in bags)		6.00@20.00
Middlebrook, Mo.—Red		20.00@25.00
Milwaukee, Wis.		14.00@34.00
Newark, N. J.—Roofing granules		7.50
New York, N. Y.—Red and yellow Verona		32.00
Poultney, Vt., 2000 lb.		6.12
Red Granite, Wis.		7.50
Sioux Falls, S. D.	7.50	7.50
Stockton, Cal. — Sized rock for roofing and stucco dashes, CL lots		12.00
Tuckahoe, N. Y.—2000 lb.		12.00
Wauwatosa, Wis.		20.00@34.00

*In bags; bulk $16.00.

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	25.00@35.00
Baltimore, Md. (Del. according to quantity)	16.00@17.00	22.00@50.00
Ensley, Ala. ("Slagtex")	12.50	22.50@33.50
Eugene, Ore.	25.00	35.00@75.00
Friesland, Wis.	22.00	32.00
Milwaukee, Wis.	14.00	30.00@42.00
Omaha, Neb.	18.00	30.00@40.00
Philadelphia, Penn.	15.00	20.00
Portland, Ore.	19.00	25.00@45.00
Prairie du Chien, Wis.	14.00	22.00@30.00
Puyallup, Wash.	20.00	30.00@90.00
Rapid City, S. D.	18.00	25.00@45.00
Salem, Ore.	23.00	90.00@100.00
Watertown, N. Y.	20.00	35.00
Wauwatosa, Wis.	14.00@18.00	30.00@42.00

Sand-Lime Brick

Prices given per 1000 brick f. o. b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.50
Boston, Mass.	14.00@15.50
Dayton, Ohio	12.50@13.50
Grand Rapids. Mich. (wholesale)	10.00
Jackson, Mich.	13.00
Lancaster, N. Y.	13.00
Michigan City, Ind.	11.00
Milwaukee, Wis.	13.00
Plant City, Fla.	12.00@16.00
Portage, Wis.	15.00
Rochester, N. Y. (delivered)	19.75
Saginaw, Mich.	13.00
San Antonio, Texas	12.50@14.00
Syracuse, N. Y.	15.00@17.00

Gray Klinker Brick

El Paso, Texas	13.00

Lime

Warehouse prices, carload lots at principal cities.

	Hydrated, Finishing	per ton Common
Atlanta, Ga.	22.50	14.00
Baltimore, Md.	24.25	17.85
Boston, Mass.	20.00	15.00
Cincinnati, Ohio	16.80	14.30
Chicago, Ill.	20.00	18.00
Dallas, Tex.	20.00	------
Denver, Colo.	24.00	------
Detroit, Mich.	16.00	------
Minneapolis, Minn. (white)	23.00	21.00
Montreal, Que.	------	21.00
New York, N. Y.	18.20	13.10
Philadelphia, Penn.	23.00	16.00
St. Louis, Mo.	24.00	20.00
San Francisco, Calif.	22.00	------
Seattle, Wash. (paper sacks)	24.00	------

Portland Cement

Prices per bag and per bbl. without bags net in carload lots.

	Per Bag	Per Bbl.
Albany, N. Y.	------	2.62
Atlanta, Ga.	------	2.35
Boston, Mass.	------	2.53
Buffalo, N. Y.	------	2.48@2.88†
Cedar Rapids, Iowa	------	2.44
Cincinnati, Ohio	------	2.47
Cleveland, Ohio	------	2.39
Chicago, Ill.	------	2.20
Columbus, Ohio	------	2.42
Dallas, Texas	.52½	2.10
Davenport, Iowa	------	2.39
Dayton, Ohio	------	2.38
Denver, Colo.	.63¾	2.55
Detroit, Mich.	------	2.35
Duluth, Minn.	------	2.19
Indianapolis, Ind.	------	2.41
Kansas City, Mo.	.51¾	1.97
Los Angeles, Cal. (less 5c dis.)	.63	2.60
Memphis, Tenn.	------	2.60
Milwaukee, Wis.	------	2.35
Minneapolis, Minn.	------	2.42
Montreal, Canada (sks. 20c ext.)	------	1.90a
New Orleans, La.	------	2.40
New York, N. Y.	------	2.25@2.65†
Peoria, Ill.	------	2.37
Philadelphia, Penn.	------	2.41@2.81†
Phoenix, Ariz.	.82½	3.65
Pittsburgh, Penn.	------	2.19
Portland, Ore.	------	3.05
San Francisco, Cal.	.65¼	2.61*
St. Louis, Mo.	.55	2.20
St. Paul, Minn.	------	2.42
Seattle, Wash. (10c bbl. dis.)	------	2.65
Toledo, Ohio	------	2.40

NOTE—Add 40c per bbl. for bags.
*5c cash disc 10 days.
†Prices to contractors, including bags.
(a) Less 10c 20 days.

Mill prices f.o.b. in carload lots, without bags, to contractors.

	Per Bag	Per Bbl.
Buffington, Ind.	------	1.95
Concrete, Wash.	------	2.60
Dallas, Texas	------	2.05
Fordwick, Va.	------	2.05
Hannibal, Mo.	------	2.05
Hudson, N. Y.	------	2.05
Kingsport, Tenn.	------	2.05
Leeds, Ala.	------	1.95
Louisville, Ky.	.64¼	2.45
Northampton, Penn.	------	1.95
Steelton, Minn.	------	2.00
Universal, Penn.	------	1.95

Cement Products

Hawthorne tile, carload lots, f. o. b. plant.

	Cicero, Ill. Per sq.	Ft. Worth, Tex. Per sq.
Silver gray	------	8.00
Red French	9.50	9.00
Green French	11.50	10.00
Red Spanish	12.00	9.00
Green Spanish	14.00	10.00

	Cicero Red	Cicero Green	Ft. Worth Gray	Ft. Worth Red	Ft. Worth Green
Ridges	.25	.35	.25	.25	.30
Hips	.20	.30	.14	.14	.17
Ridge closers	.05	.06	.06	.06	.06
Hip terminals, 3 way	1.25	1.50	1.00	1.00	1.25
Hip starters	.50	.60	.22	.22	.25
Gable finials	1.25	1.50	1.00	1.00	1.25
Gable starters	.20	.30	.14	.14	.16
End bands	.20	.30	----	----	----
Eave closers	.06	.08	.06	.06	.06

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

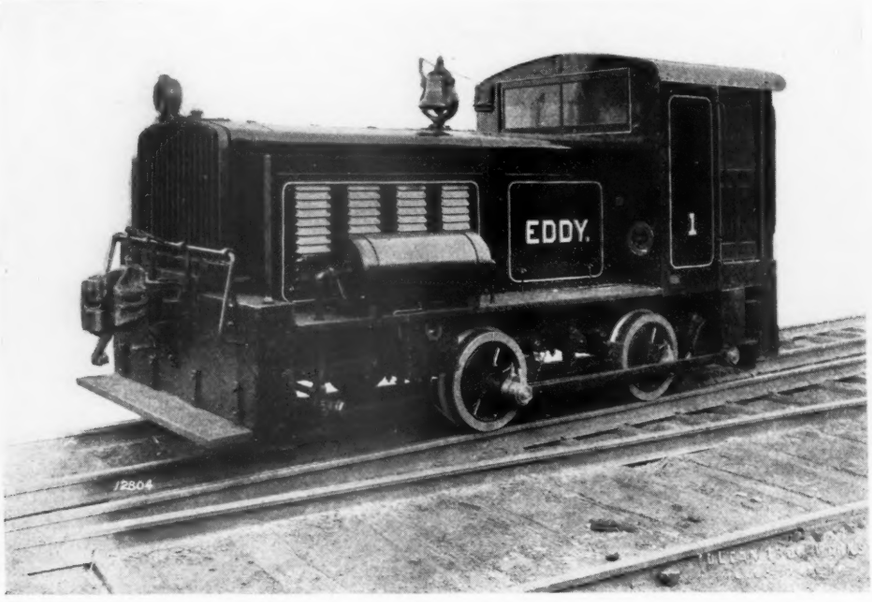
	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	White Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	Plaster Board ¼x32x36" Weight 1500 lb. Per M Sq. Ft.	Plaster Board ⅜x32x36" Weight 1850 lb. Per M Sq. Ft.	Wallboard, ⅜x32 or 48" Lengths 6'-10', 1850 lb. Per M Sq. Ft.
Agatite, Texas (a)	------	------	6.00	10.00	10.00	10.50	10.00	------	19.00	------	------	------	------
Akron, N. Y. (a)	3.00	4.00	6.00	10.00	10.00	10.00	20.20	7.00@9.00	27.35	21.00	19.375	20.00	30.00@32.00
Blue Rapids, Kans. (a)	2.50	4.00	6.00	10.00	10.00	10.50	10.00	------	23.15	19.00	19.375	20.00	------
Douglas, Ariz.	------	------	7.00	------	16.50	------	19.50	------	------	15.50	------	------	------
Ft. Dodge, Iowa (a)	2.50	4.00	6.00	10.00	10.00	10.50	15.45	------	22.70	20.00	19.375	20.00	30.00
Grand Rapids, Mich.	2.65*	6.00†	6.00†	7.00‡	------	10.00‖	------	------	------	------	------	------	------
Gypsum, Ohio (a)	2.75	4.00	6.00	10.00	10.00	10.00	19.25	7.50	26.85	19.00	19.375	20.00	30.00
Hanover, Mont.	------	------	------	11.80	------	------	------	------	------	------	------	------	------
Port Clinton, Ohio	3.00	4.00	6.00	8.00	9.00	9.00	21.00	7.00	30.00	20.00	------	20.00	30.00
Portland, Colo.	------	------	------	10.00	------	------	------	------	------	------	------	------	------
San Francisco, Calif.	------	------	9.85	------	14.40	------	15.40	------	------	------	------	------	------
Winnipeg, Man.	5.50	5.50	7.00	13.50	15.00	15.00	------	------	------	------	28.50	------	35.00

NOTE—Returnable Bags, 10c each; Paper Bags, 1.00 per ton extra (not returnable).
*To 2.75; †to 8.00; ‡to 10.00; ‖to 12.00; (a) prices are net of bags.

New Machinery and Equipment

New Gasoline Locomotive With Air Brakes

THE Vulcan Iron Works, Wilkes-Barre, Penn., announces that it is manufacturing a new type of gasoline locomotive which weighs 13 tons, and is of standard gage.



New locomotive with air brakes as made for a big pulpwood company

The locomotive has several new features, but perhaps the most interesting is the Westinghouse air brake equipment. This is said to be the smallest locomotive ever equipped with regular air brakes of this sort. It was considered necessary, however, in order to make the locomotive able to contend with heavy grades and the slippery track it would encounter in wet weather.

The manufacturer say "that the equipment used is the Westinghouse Type A. M. M., consisting of air compressor, gear driven from the engine shaft and provided with governor and automatic unloader. When pressure reaches a predetermined point the governor unseats the intake valves and when pressure drops the governor automatically cuts in the valves. The operator's valve is type "M-24" with type "A" bracket and "C-6" feed valve. The equipment is for both straight and automatic application, that is, for braking on both the locomotive and car wheels, and the valve used is so designed as to operate both with only one handle. Two main reservoirs of ample capacity are provided and located on each side of the locomotive. Auxiliary reservoirs, triple valve and double check valve are conveniently located underneath the running boards in an accessible position for inspection and testing. The brake operating cylinder is located so that the piston packing can easily be replaced when worn. The air operating cylinder is inter-connected with a separate brake lever in the cab, so that brakes can be applied by hand in case of air failure. Regulation air hose is provided both front and rear of locomotive for coupling to standard railroad cars, and the entire brake arrangement meets with the requirements of the I. C. C. Of particular interest is the fact that the airbrake apparatus can be instantly released from service, if necessary, and the auxiliary hand brake used exclusively.

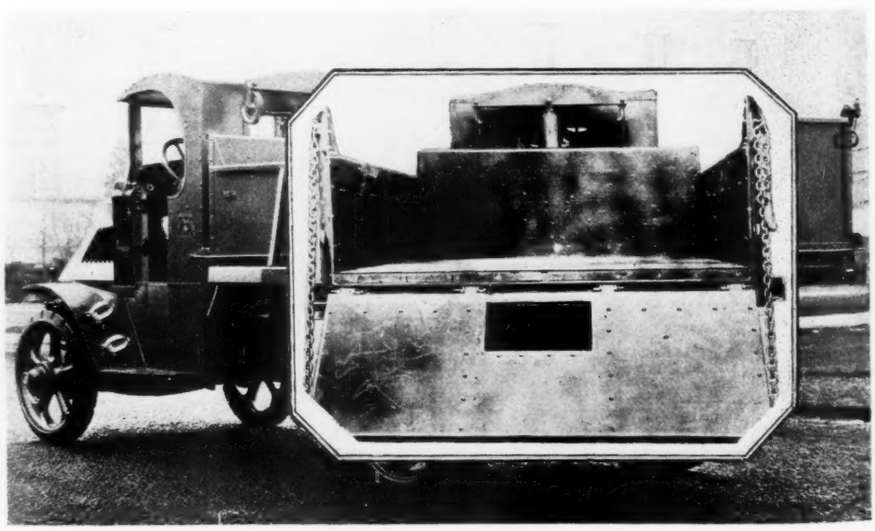
"This locomotive is equipped with spring-draft rigging both front and rear. This feature is provided for the purpose of absorbing the shocks encountered in coupling to heavy standard gauge cars, thereby protecting the running gear and motor and assuring longer life for the locomotive. The cab is of Vulcan standard construction, made of steel and specially adapted to cold weather conditions. Cab has sliding doors at rear and left side and all windows are adjustable, affording comfort under all climatic conditions. A heater is also provided in the cab for use in cold weather.

"The whole design and construction is typically Vulcan and steam locomotive practice is followed wherever possible. Frames are of open hearth cast steel, and wheels have cast iron centers with steel tires. Locomotive is equipped with a 110-hp. six-cylinder, Climax engine and transmission is the Cotta constant-mesh type giving four speeds forward and four speeds reverse. The manufacturers' ratings for tractive forces and speeds are as follows: 2 m.p.h., 7800 lbs.; 3.56 m.p.h., 6500 lbs.; 5.9 m.p.h., 5100 lb.; 10.5 m.p.h., 2800 lb.

"This same design is built in 15, 20 and 25 ton sizes."

Truck Body With Renewable Floor

A TRUCK feature which will interest those makers of rock products that maintain a truck delivery service is a new steel Mack truck body which has a renew-



The truck body has renewable wooden bottom

able floor. It is made by the International Motor Co., 25 Broadway, N. Y.

This truck body is the outgrowth of many experiments which were made in order to find a body that would resist the wear that came from trucking such abrasive substances as crushed stone and sand and gravel. Starting with ⅛-in. plate, steel was tried up to ⅝-in. in thickness, and it was finally decided that nothing less than armor plate, in the way of steel would stand such a wear as the floor of a truck encountered in handling these materials. Finally a body was built which was an all steel body inside of a heavy wooden body. The new body illustrated herewith retains all the advantages of this construction, with the added advantage of a replaceable creosoted plank floor.

New Plymouth 18-Ton Gasoline Locomotive

THE Fate-Root-Heath Co. (Plymouth Locomotive Works), Plymouth, Ohio, announces, as an addition to its present line of models and sizes, its new Model HL 18-ton locomotive, for which it reports an urgent demand developing, due to the growing popularity of gasoline-powered equipment. This model is offered for use in quarries and sand and gravel pits, switching of railroad cars, and for handling large and heavy industrial and construction cars. It is furnished in all track gages from 23⅝ to 56½ in.

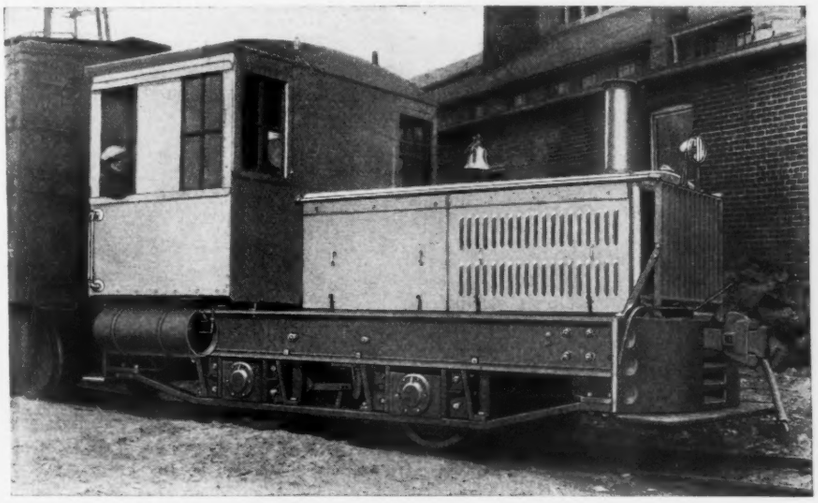
"It is built on heavy lines and is substantial throughout, the foundation being an exceedingly heavy frame with steel girder-beam and bar sides and cast-steel bumpers of liberal dimensions to withstand the severe strains and stresses thrown upon a locomotive in the service for which it is intended. The wheels, all four of which are drivers, are 33 in. in diameter, with flange and tread suited to type of track used, either standard railroad or industrial. The axles are alloy steel, heat treated, and fitted with Hyatt heavy-duty roller bearings, with hardened sleeves to take the wear of the bearings, and the bearings enclosed in dust-proof journal boxings carrying bronze thrust plates to take care of the thrust of the axles. Various size shims, that space the journal boxes, afford an excellent and easy means of chain adjustment. Two well proportioned coil springs are provided with each journal boxing, effecting positive yet easy spring action and easy riding.

"The power plant consists of a Climax R-6, 6-cylinder, vertical, L-head engine, with 5½-in. bore and 7-in. stroke, of heavy-duty type with full force feed oiling system and built-in governor. This is provided with high-tension dual-ignition system, using both magneto and battery to insure positive service. Stromberg M-5 carburetor, with air cleaner, is used, that is especially designed for this size engine and the sudden demand for its full power. A 12-volt back-geared starting motor and large storage battery afford a positive starting unit ready under all conditions. Modine sectional spirex core radiator, with 30-in. diameter fan, affords ample cooling for this large engine under the heaviest kind of work.

"The clutch is a combination of Twin Disc and Plymouth design, the faces being very wide to insure positive contact when engaged and at the same time easy action when being engaged. A valuable feature is provision through a drilled clutch shaft for lubricating, with Alemite gun, the pilot bearing in the flywheel.

"The transmission is the Plymouth standard sliding gear type, with 4 speeds, both forward and reverse, providing speeds of 2⅔, 6, 12, and 24 miles per hour. This transmission embodies the Plymouth feature of the final driving shaft and gear being used in the gear case and in addition a double reduction between the clutch and regular driving gears. The gears are all high-grade alloy steel, cut and hardened, with faces from 2½ to 5 in. wide and from 6½ to 28½ in. in diameter, but are shifted with great ease. All shafting and bevel reversing gears are carried on high-grade ball bearings mounted in, and lubricated automatically from the inside of, the gear case. This transmission is designed with the idea of eliminating the difficulties incident to the use of jaw clutches, and the gears are of such design as to insure exceedingly long life.

"Hand brakes, of the handwheel and screw type, operating brakes on all four wheels are provided regularly for industrial service, while straight system air brakes are furnished when required, as are also Westinghouse automatic air brakes for railroad service. The sanders are air operated, insuring a postive flow of sand through the large-sized flexible sand pipes. This type of sander is furnished, whether air brakes are supplied or not, in connection with an air whistle which is standard equipment. In addition to the whistle a bronze bell completes the signaling equipment.

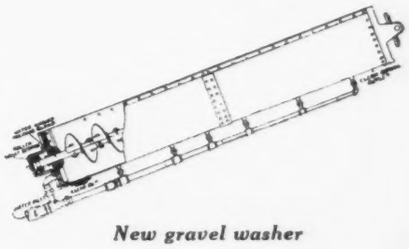


New 18-ton locomotive adapted to heavy work on all track gages

The Eagle Gravel Washer

THE gravel washer and sticker manufactured by the Eagle Iron Works, Des Moines, Iowa, has a 24-in. tub with water inlets to the bottom, set on an angle so that the water flows toward the lower end. The gravel is fed into the lower end and conveyed through the water by means of a chilled iron screw with replaceable flights, so that any section may be replaced without taking out the screw. The action is such that the gravel is constantly agitated, thus causing all sticks, silt, coal, and shale to flow out over the outlet with the dirty water while the gravel is conveyed up the inclined tub and out the upper end.

A unique feature of the apparatus is the manner in which the thrust bearing is protected. The thrust bearing is a Timken or Gillian combined radical and thrust bearing set back and entirely outside the tub. Between the bearing and in the end of the tub is a packing gland. A flow of water is forced into the tub along the shaft thus, preventing sand or grit from encountering the packing in the gland and cutting the packing out.



New gravel washer

This washer is suitable for removing refuse of any sort that is lighter than the gravel itself; mud balls and silt are entirely removed, it is stated. The equipment may be added to the equipment of any sand and gravel plant at a very slight expense, the manufacturer states.

The Bulking of Moist Sand

THE fact that dry sand weighs more than the same sand in a moist condition has long been known. In fact, it was investigated thirty years ago. But the effect of this "bulking" of moist sand, as it has come to be called, upon the design of concrete mixtures was not realized until such design became the subject of serious scientific study.

To nullify this effect of bulking on concrete-mix design, three methods have come into use of late. The first is to buy sand by weight and to use weights instead of volumes in making the concrete mixture. The second is to buy sand by volume but to use a correction factor for bulking. The third is the inundation method in which the sand is thoroughly saturated with water before being added to the mixer, as it has been found that thoroughly saturated sand has a constant volume for the same weight.

Of these methods the inundation method would seem to be the most accurate as it gives another required correction—that which is necessary to keep the water-cement ratio constant. With the other methods, weighing and correcting by the use of a factor, the same thing may be done by determining the moisture content of the damp sand, but moisture samples are uncertain things and damp sand rapidly loses its moisture, as it is handled in transportation and mixing.

Iowa, Florida, and perhaps some other states, avoid the effect of bulking on concrete for highways by buying and mixing sand by weight. New Jersey, at least in some instances, has used a factor for correction.

It is quite evident that bulking affects the concrete mix in two ways: first, it decreases the yield in yards of concrete in place for the yards of material mixed, and second, it affects the strength of the concrete. The United States Bureau of Public Roads recently made a number of tests to show how much and in what way the concrete was affected. These are explained in an article by Arthur A. Levison, in the magazine, *Public Roads*, from which the illustrations accompanying this were taken. Concerning these effects Mr. Levison says:

"It is well known that nearly all of our laboratory tests, investigations and research on concrete have been based on mixtures with dry sand, while in practice on construction a dry sand is seldom available. Assuming that a 1:2:4 mix is under consideration, the laboratory bases its findings on the true mix with dry materials, whereas on the job it is quite probable that the mix approximates more nearly 1:1.16:4. As a result of this the field concrete will have a richer mortar than intended, but there may be a deficiency of mortar which will affect both the workability and density of the concrete. If the workability is impaired, the tendency is to use more mixing water and thus the greater richness of the mortar may be offset. It follows, therefore, that a deficiency of mortar may have a direct effect on the strength and yield of concrete."

After describing the method of making the tests, several conclusions are drawn. The most important of these are:

"The decrease in yield due to using the nominal volume of damp sand without a correction for bulking is 7% for a 1:2:4 mix and 8½% for a 1:2:3 mix.

"The decrease in yield due to using damp sand without a bulking correction and omitting the smaller sizes of coarse aggregate is 12%.

"For a 1:2:4 mix, the mixes made with dry sand averaged 14% stronger than those made with the same volumes of damp sand. For a 1:2:3 mix, the mixes made with dry sand averaged 3% weaker than those made with the same volumes of damp sand.

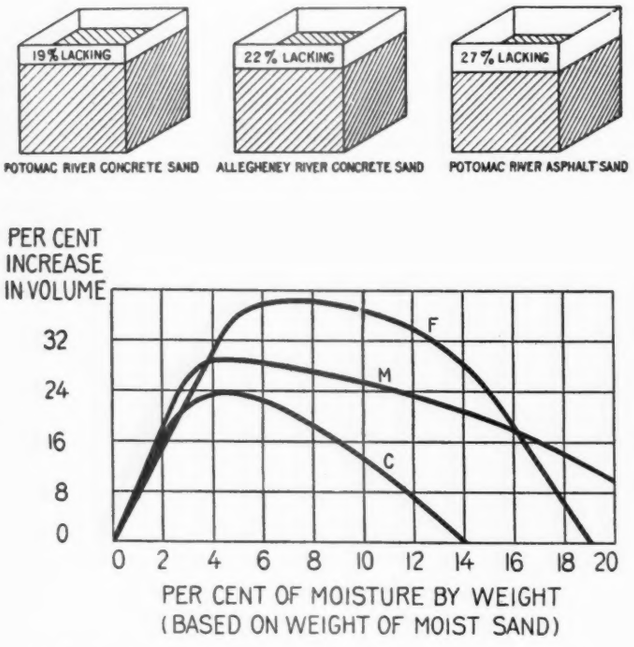
"With a 1:2:4 mix, the cylinders made with dry sand and well-graded coarse aggregate averaged 17% stronger than those made with damp sand and poorly graded coarse aggregate. With a 1:2:3 mix, this difference in strength was 12% in the same direction."

The same experiments included tests on concrete made with damp and dry sand, omitting the coarser sizes of aggregate, and from these tests it is concluded that:

"The decrease in yield due to the omission of coarse aggregate between one-fourth and three-fourths inches in size is from 3 to 4%.

"The omission of the smaller sizes of coarse aggregate resulted in a decrease in strength of from 12 to 14%."

One of the charts reproduced here gives the result of the tests in detail.



Above—Bulking on various sands. Below—Effect of moisture on bulking on three different sands

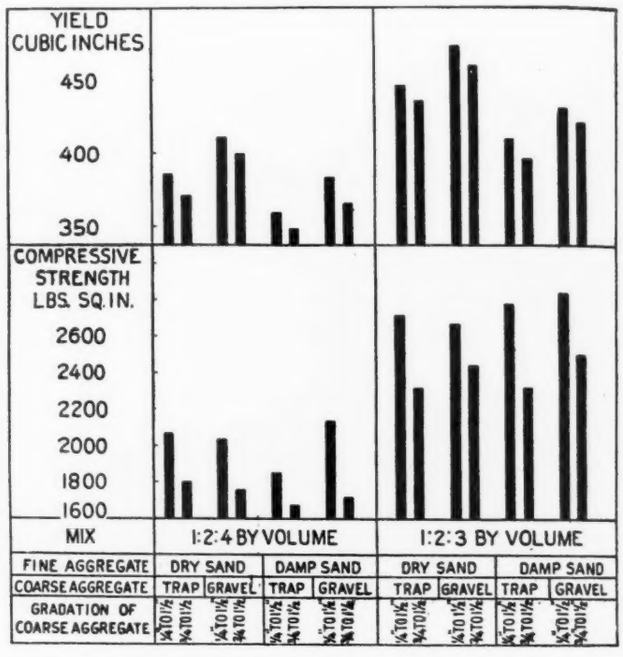


Chart showing the result of tests to determine effect of bulking on yield and strength of concrete

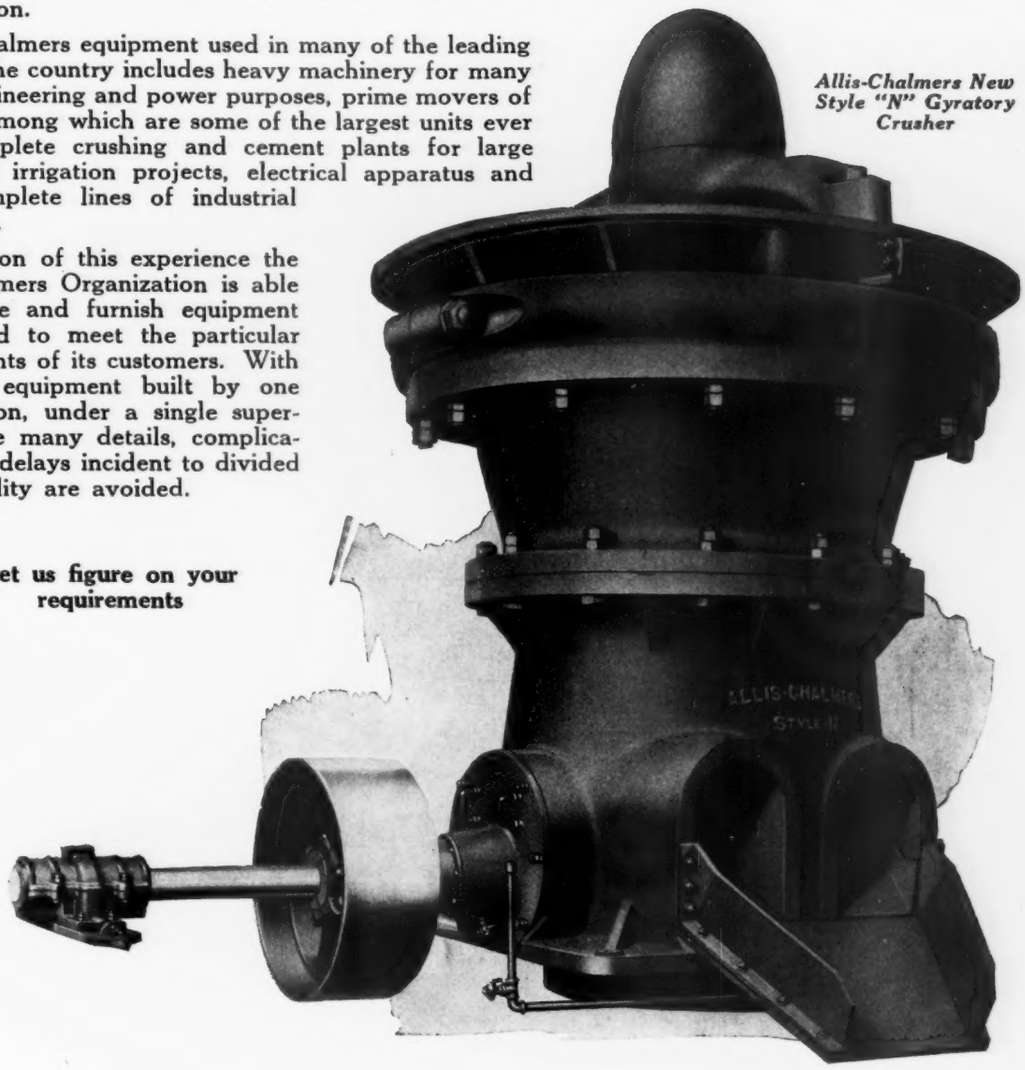
Where There Is Undivided Responsibility

Whether you are planning a new plant, an extension or a replacement, the value of undivided responsibility in connection with your new equipment is an important consideration.

Allis-Chalmers equipment used in many of the leading plants of the country includes heavy machinery for many varied engineering and power purposes, prime movers of all types among which are some of the largest units ever built, complete crushing and cement plants for large dams and irrigation projects, electrical apparatus and many complete lines of industrial machinery.

By reason of this experience the Allis-Chalmers Organization is able to propose and furnish equipment best suited to meet the particular requirements of its customers. With complete equipment built by one organization, under a single supervision, the many details, complications and delays incident to divided responsibility are avoided.

Let us figure on your requirements



Allis-Chalmers New Style "N" Gyratory Crusher

ALLIS-CHALMERS PRODUCTS
Electrical Machinery
Steam Turbines
Steam Engines
Gas and Oil Engines
Hydraulic Turbines
Crushing and Cement Machinery
Mining Machinery

ALLIS-CHALMERS MANUFACTURING COMPANY

MILWAUKEE, WISCONSIN, U.S.A.

ALLIS-CHALMERS PRODUCTS
Flour and Saw Mill Machinery
Power Transmission Machinery
Pumping Engines-Centrifugal Pumps
Steam and Electric Hoists
Air Compressors - Air Brakes
Agricultural Machinery
Condensers

News of All the Industry

Incorporations

Cote de Neiges Artificial Stone Co., Montreal, Que., has been registered.

Marion Cement Products Co., Marion, Ohio. Hector S. Young and G. K. Kobarger.

National Cement Block and Supply Co., Toledo, Ohio; $30,000. Claud B. Fellsbaum and Merle T. Johnson.

Western Sand and Gravel Co., Portland, Ore.; $25,000. C. J. Young, Andrew Koerner and Henry F. Cabell.

James Stone Co., Richland, Texas; capital stock $100,000. Incorporators: W. S. James, C. R. Wharton and Brady Cole.

A. S. W. Concrete and Construction Co., 565 Fifth avenue, New York. S. Siegel, S. M. Wittner and L. J. Merrell.

Olean Cement Products Co., Schenectady, N. Y., $15,000. C. and S. and J. De Matteo. Attorney, J. C. Cooper, Schenectady.

Concrete Interlocking Tile Corp.; $100,000. Wilmington, Delaware, incorporation. (Colonial Charter Co.)

Consolidated Gravel Co., Dallas, Texas, $150,000. P. H. Smith, M. L. Whitney and Allen Wright, incorporators.

Clayton-Kaestner Sand and Gravel Co., Milwaukee, Wis., $100,000. Bruno E. Kaestner, Roy B. Clayton and Rose M. Domke.

Paul Cherigorli and Dominick Piombo have engaged in business at 8 Avery street, San Francisco, Calif., as California Concrete Co.

Cambridge Cement Stone Co., 156 Lincoln street, Brighton, Mass., plans alterations and additions to plant. Esimated cost $40,000.

Donovan Supply Co., 217 Smith street, Perth Amboy, N. J.; manufacturing cement blocks, artificial stone, building materials, etc.; $125,000.

Consolidated Gravel Co., Dallas, Tex., capital, $150,000, incorporated by P. H. Smith, 3629 Princeton street; M. L. Whitney, Allen Wight.

Lone Star Granite Co. has been incorporated with a capital stock of $60,000, in Llano, Texas, by Kellus Carter, Geo. D. Ramsey and A. C. Cheim.

Norfolk Sand and Gravel Corp., Norfolk, W. Va. Robert Lacy, Baltimore, Md., president; William L. Parker, Norfolk, secretary, and F. P. Garrett.

Bellevue Sand and Gravel Co., has been incorporated in Clinton, Ia., with a capital stock of $65,000, by George H. Schneider and George A. Schneider.

Southern Rock Asphalt Co. has been incorporated in Oklahoma City, Okla., with a capital of $100,000, by J. J. Harden, R. D. Farmer and Wm. Fleming, Jr.

Tampa Asbestos Co. has been incorporated in Tampa, Fla., with a capital of $5,000, with J. F. Senour, president, 6621 Crane street, and J. W. Barber, Jr., secretary.

Blackhawk Gravel and Sand Co., Rockford, Ill., $15,000. Incorporators, M. R. Hooge, J. D. Hooge, I. W. Huyett. Correspondent, Charles B. Joyce, 347 West State street, Rockford.

St. Louis Duntile Co., has been incorporated in St. Louis, Mo., with a capital stock of $15,000, by F. C. Schoenthaler, H. Frauenfelder, and C. F. Sanford, 537 Ridge street, to manufacture Duntile and concrete products.

West End Concrete Block Manufacturing Co., Pittsburgh, Penn.; capital, $25,000. Manufacturing and selling building materials. Incorporators: J. M. Bernett, Wilkinsburg; Raffaelo Corvino, Christ Best, Pittsburgh.

Plymouth Rock and Sand Co., Inc., has been chartered in El Monte, Calif., with a capital stock of $60,000, by Wilford M. Taylor, El Monte; Paul D. Green, John W. Loy, G. L. Booth and J. C. Booth of Los Angeles.

Fremont Sand and Gravel Co., Fremont, Neb., organized by A. A. Nehrbas, Arthur Baldwin and Clarence King with a capital stock of $30,000. The company will deal in sand and gravel taken from pits on the Stecher farm west of Fremont, which it has purchased.

Superior Flake Graphite Co., 76 West Monroe street, Chicago, Ill. Capital, $75,000; manufacturing and deal in graphite and products thereof. Incorporators: W. J. Carney, Marvin B. Joyce and William S. Joyce. Correspondent: Ryan, Condon and Livingstone, 1600 First National Bank building.

Sand and Gravel

Northeast Missouri Sand and Gravel Co., is to move its plant from Silex to Saut River, Mo., according to a local paper.

Wolf River Sand Co., Memphis Tenn., has amended its charter so as to change the name to Wolf River Sand and Gravel Co.

Steve Luczkowski, William Lemanski and Frank Golat of South Bend, Ind., have formed a partnership to deal in sand and gravel.

Neary and Co., Seattle, Wash., have changed the name to West Side Sand and Gravel Co., and increased the capital from $10,000 to $25,000.

Hess & Co., Redwood City, Calif., have been granted a permit by the city council to construct gravel and sand bunkers in Franklin street, that city.

Covina Land and Water Co., Covina, Calif., recently transferred to the Los Angeles Rock and Gravel Co. the title to 373 acres of land lying west of Baldwin Park.

Marion (Ind.) Sand and Gravel Co., John Weigel, president, is building a new screening and washing plant. Sand is taken from the bed of the river near Marion.

Arkansas River sand producers in Oklahoma will be interested in a bill which has been introduced in the Oklahoma legislature which appropriates to pay royalties illegally collected by the state on sand taken from the river bed.

National Rock and Gravel Co., has been absorbed by the National Rock Products Co., Inc., a new $150,000 corporation controlled by the same interests and having the same officers and directors. The plant, located at Aoscoe, Calif., has been enlarged, new and modern equipment installed and production increased to 900 tons daily.

Quarries

Mid-West Crushed Stone Co. has appointed John Murnane superintendent of the quarry at Greencastle, Ind.

Abilene, Kan., is another city that has gone into the rock crushing business. It has installed a crusher and is crushing old curbstones and paving to be sold in the spring.

George R. Steinhauser, 6925 Michigan street, St. Louis, Mo., purchased 50,000 acres of land near Coleman, Fla., and will put in equipment for a rock quarry.

Alfred Paul, Paulsboro, Ariz., has purchased the Parsons quarry at El Frieda. He has moved the entire equipment to his lime quarry at Paulsboro, where he is preparing to enlarge operations.

C. and J. Lamp of Ocala, Fla., have under construction a rock crushing plant at Camp, Fla., to have daily capacity of 1000 tons, and will be operated by electricity. James T. Rawls is general superintendent.

R. Hamilton, who founded and for many years operated the Hagersville Crushed Stone Co., Hagersville, Ont., recently disposed of his interests. Mr. Hamilton designed, assembled and operated the plant. He and Mrs. Hamilton have started on a five months' trip through North America.

Basalt Rock Co. of Napa, Calif., reports having secured a contract from the largest retail rock dealer in San Francisco for delivery of 80,000 tons of crushed rock. The order covers more than one-half the output of the Basalt quarries and is renewable for a total period of five years based on the market price at the time of delivery.

National Mortar and Supply Co.'s quarry foreman, John Fehlhaber, was caught in a bin of crusbed stone and sand and held for seven hours. The contents of the bin were frozen so that they would not run to the outlet and Fehlhaber stepped on the mass to loosen it. He was rescued by cutting through an 18-in. wall, which formed the side of the bin and allowing the stone to flow out through the hole. If the chute at the bottom had been opened the mass would have buried him.

Cement

Boyne City (Mich.) Cement Co. has purchased in Norwood township, fronting on Lake Michigan, in Charlevoix county, 1700 acres of limestone deposit from L. J. Nash of Manitowoc, Wis. A loading dock will be built in Norwood eventually, but temporarily the company will get its stone from Rogers City.

Petoskey Portland Cement Co. and its allied corporation, the Petoskey Transportation Co., at the annual meetings voted to retain all the old directors. The directors re-elected officers, with J. B. John of Newaygo as president. The Petoskey cement plant will be doubled in capacity this year, according to local papers.

Peralta Cement Co. of San Francisco, Calif., has filed application with the United States engineer's office in that city seeking authorization of dredge materials from the southern arm of San Francisco bay on the eastern edge of the channel, about three miles northeast of San Mateo point. It is proposed to dredge approximately 4,000,000 cu. yd. of material from an area of 2900 ft.

Monolith Portland Cement Co. of Monolith, Calif. (offices in Bartlett building, Los Angeles), manufacturing Monolith plastic waterproof portland cement, reports a gratifying increase in business during the last year. At a meeting of the company directors, January 2, the regular semi-annual dividend of 4% on preferred and a dividend of 8% on common stock was authorized to be paid during January.

Signal Mountain Cement Co., Chattanooga, Tenn., has accepted the resignation of Clarence S. Steward as vice-president and manager. Mr. Steward has been actively engaged from the start of the company in building up the business and now that all the stock has been sold and the company is in a very substantial condition he feels that he can give his time to many other business interests. He will retain his interest in the cement company.

Lime

Pacific Concrete Cutting Co., Los Angeles, Calif., is prospecting its lime desposits near Three Rivers, Calif.

Lime muck escaping from a dam in which it was stored swept down the Holston valley, near Saltville, Va., causing several deaths and injuries. The lime was refuse from an alkali works.

Bruns Hydrate Lime Co., Woodville, Ohio, will begin the construction of its new plant as soon as the weather will permit. The site is a quarter of a mile east of Woodville. Chas. Kaemming is president of the company.

Holmes Lime and Cement Co., San Francisco, Calif., recently completed the erection of a $25,000 mortar plant at De Haro and Division streets. The plant is now in operation. It is four stories in height and of frame construction.

Santa Cruz Lime Co. has filed a certificate of the extension of the corporate existence with the county clerk at Santa Cruz, Calif. The company has been in existence since December 12, 1874, and the capital stock fixed by the articles of incorporation was $500,000. It was voted, at a recent meeting of the company in San Francisco, to extend the corporation rights another 50 years. Of the capital stock, 362 shares at $1000 a share is held by the Santa Cruz Portland Cement Co of San Francisco and 69 shares by Bertha Coope.

Cement Products

A. B. Howe is building a cement monument and products plant is Kennewick, Wash.

C. H. Bliss, Pensacola, Fla., manufacturer of concrete blocks, is building a branch factory in Milton, Fla.

Hanibal Planta is building a cement products plant at San Antonio, Texas. The Nels-Stone process will be used.

J. J. Merritt Co., Sacramento, Calif., is erecting a concrete products plant in North Sacramento. It will manufacture drain tile, septic tanks, irrigation and sewer pipes.

ARNOLD & WEIGEL

CONTRACTORS AND ENGINEERS

KILNS
HYDRATORS
ENGINEERING-
SERVICE

Located at

WOODVILLE, OHIO
U·S·A

"The Lime Center of the World"

Cost—first or last?

HOW do you figure the cost of a crane or shovel—on what you must pay when you buy it or on what it will cost over a period of years?

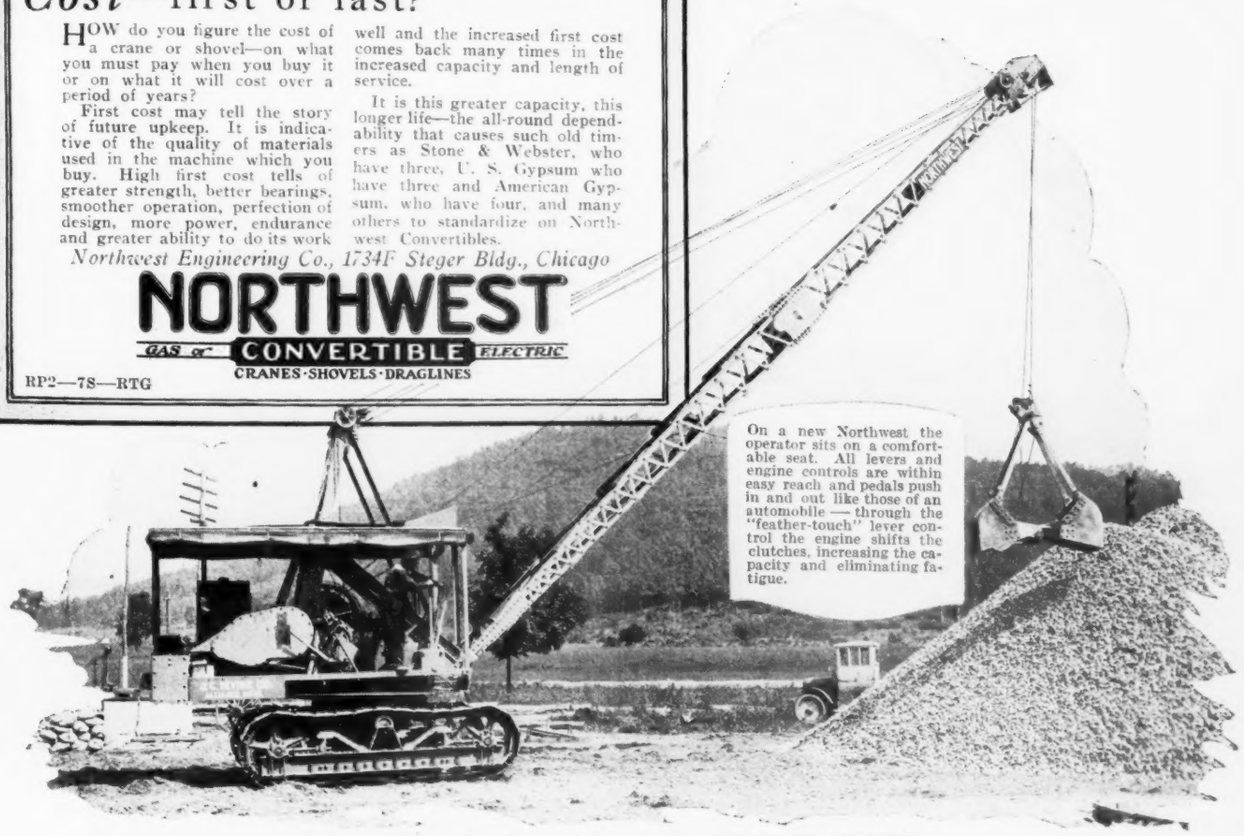
First cost may tell the story of future upkeep. It is indicative of the quality of materials used in the machine which you buy. High first cost tells of greater strength, better bearings, smoother operation, perfection of design, more power, endurance and greater ability to do its work well and the increased first cost comes back many times in the increased capacity and length of service.

It is this greater capacity, this longer life—the all-round dependability that causes such old timers as Stone & Webster, who have three, U. S. Gypsum who have three and American Gypsum, who have four, and many others to standardize on Northwest Convertibles.

Northwest Engineering Co., 1734F Steger Bldg., Chicago

NORTHWEST
GAS or CONVERTIBLE ELECTRIC
CRANES·SHOVELS·DRAGLINES

RP2—7S—RTG



On a new Northwest the operator sits on a comfortable seat. All levers and engine controls are within easy reach and pedals push in and out like those of an automobile — through the "feather-touch" lever control the engine shifts the clutches, increasing the capacity and eliminating fatigue.

Pacific Terrazo Marble Co. has been admitted to membership in the Builders' Exchange of San Francisco. The company will specialize in cement, mosaic and terrazo products.

Pioneer Sand and Gravel Co., Seattle, Wash., has secured a license to manufacture Stone-Tile, a patented form of concrete block in Seattle and the surrounding district.

Pine Bluffs Concrete Co. is a new concern for making cement products at Pine Bluffs, Ark. William Groves and J. E. Kramer of Pine Bluffs are at the head of the business.

E. H. Higgins Building Material Co. is having machinery installed in Richmond, Calif., where the firm will engage in the manufacture of cement hollow blocks, cement brick and roofing tile.

Salinas Valley Pipe Co. has leased a two-acre site near Soledad, Monterey county, California, on which will be established a plant for the manufacture of concrete pipe and other cement products.

Granitite Manufacturing Co., manufacturers of stucco, flooring and table tops, announce the removal of offices and factory from 116 Utah street to 209 Utah street, San Francisco. Larger and more commodious quarters were necessary to meet increased business.

Lansing (Mich.) Cast Stone Block Co. has elected the following as officers for the ensuing year: Edward B. Ramsey, president and general manager; M. R. Carier, vice-president; George Hagemeir, secretary and treasurer. These officers and Charles E. Toms, B. S. Gier, J. G. Reutter and Jay M. Smith comprise the board of directors.

Silica Sand

Pittsburgh White Sand Co., Mapleton, Penn., is reported to have succeeded to the property of the Speer White Sand Co., Berkeley Springs, W. Va., and will remodel and operate the plant. W. C. Stevenson is manager.

Personals

R. B. Randall, former Western sales manager of the Blaw-Knox Co., has been appointed Western sales manager of the G. H. Williams Co., manufacturers of the Williams buckets.

Otto Wartenweiler, consulting engineer of Los Angeles, has entered the firm of Smith-Emery Co. of Los Angeles, Calif., taking charge of physical testing and mechanical engineering.

E. K. Smith, city engineer of Beloit, Wis., has resigned and after February 15 will be associated with the highway department of the Portland Cement Association, with headquarters in Chicago.

E. B. Nicholi has accepted the position of superintendent of the Crushing Stone Co., Inc., of Schenectady, N. Y. Mr. Nicholi was formerly connectde with the Tradewater Portland Cement Co., Union Bridge, Md.

Theodore Hanau, for many years in the New York sales office of the S. Flory Manufacturing Co., Bangor, Pa., has been transferred to the home office of his company in Bangor, Penn., where he will direct the sales of contracts, marine, deck and material handling equipment.

C. B. Starr has joined the Robert June Engineering Management Organization of 8835 Linwood avenue, Detroit, Michigan. Mr. Starr is a graduate of Cornell University and he was assistant mechanical engineer with the Duff Manufacturing Co. of Pittsburgh, Penn., and later served as sales engineer with the Detroit office of the Wayne Tank and Pump Co.

Charles D. Cullom of the Riverside Portland Cement Co. has been elected president of the Building Materials Dealers' Credit Association of Los Angeles for the year 1925. C. H. Kuhnle of the Tropico Potteries, Inc., and C. H. Boggs of the Blue Diamond Co. were appointed directors, the former representing the clay products industry and the latter the rock, sand and gravel interests.

Gypsum

Standard Gypsum Co., San Francisco, Calif., is shipping a 26-ton crusher to San Marco Island, about 1000 miles out in the Pacific from San Francisco. The crusher was made by the Ehrsam Manufacturing Co., Enterprise, Kan.

Feldspar

Oxford Mining and Milling Co., Portland, Me., is erecting a 48x98 ft. feldspar grinding mill at West Paris, Me., to cost with equipment approximately $100,000. The process of grinding will be so automatic that only a small crew of workers will be necessary.

Obituary

Ralph C. Richards, one of the organizers and president of the National Safety Council, died at his home in Geneva, Ill., January 3. He was 69 years old and for 54 years was claim agent of the C. & N. W. R. R. In this work he became acquainted with the importance of the human factor in accidents and this led to the establishment of safety organizations. From railroads the movement spread to factories and other industrial plants, and it is estimated that Mr. Richards' work has saved thousands of lives.

Manufacturers

The company is organized as a close corporation, all stock being held by the employes.

C. O. Bartlett and Snow Co., Cleveland, Ohio, announces that after January 5 the company will be located at 6200 Haward avenue.

Blodgett Engineering and Tool Co. of Detroit have added Roy Gill to their sales organization. Mr. Gill is well known throughout the machine tool field in the United States and will work directly out of the Blodgett factory as a special sales and service representative.

The Scott Valve Manufacturing Co. of Detroit have appointed Chas. H. Tinker Co., 201 Devonshire street, Boston, Mass., as New England representatives for the Scott line of bronze and iron body valves. Russell F. Kleinman, Land Title building, Philadelphia, Penn., has also been appointed sales representative for this company.

Northwest Engineering Co., 28 East Jackson boulevard, Chicago, builders of gasoline and electric convertible cranes, shovels and draglines, announces two new arrangements with territorial agents. The distric about Minneapolis and St. Paul will be handled by Borchert-Ingersoll, Inc., 2360 University avenue, St. Paul. The territory in and about Davenport, Ia., will be handled by Girke-Robinson, Kahl building, Davenport, Ia.

The officers of the new corporation are: John A. Sauerman, president and treasurer; D. D. Guilfoil, vice-president; G. H. Tompkins, secretary. These officers, together with the following, are the directors: L. E. Dierks, W. R. Elden, H. A. Roe, B. T. Macy, Louis McLouth and Edw. T. Pares. Mr. Pares has been the firm's attorney for a number of years. The other directors and officers are all old employes of the business and hold managerial positions.

Sauerman Bros. Incorporates. The current Sauerman News announces the incorporation of Sauerman Bros. under the laws of Illinois. This firm manufactures the Sauerman cableway dragline excavator, scraper buckets and hoists and does a large business not only in the United States but all over the world. The business was founded by John A. Sauerman in 1909 and conducted by him individually until 1911, when his brother, Henry B. Sauerman, joined him in a co-partnership to take charge of the engineering end of the business. The business was conducted as a co-partnership until the death of Henry B. Sauerman in 1919, when the business again was taken over by the surviving partner and conducted under the firm name of Sauerman Bros.

Trade Literature

Raymond Bros. Impact Pulverizer Co., 1315 North Branch street, Chicago, has issued a new bulletin stressing the importance of buying a pulverizing machine on its record of performance.

Track Specialties Co., 29 Broadway, New York, has issued its 1925 catalog. This concern makes the Trasco line of devices which include about everything that is needed for steam or electric tracks.

United American Metals Corp., 196 Diamond street, New York, has issued a booklet devoted to the babbitting of crusher bearings and the bearings of cement machinery. This firm makes the Syracuse babbitts alloyed by the Stanley Process.

Geo. D. Whitcomb Co., Rochelle, Ill., manufacturers of gasoline, storage battery, trolley, and combined trolley and storage battery locomotives, has just issued a new bulletin, No. 2512, covering the subject of seven-ton gear drive gasoline locomotives.

L. P. Green, 53 W. Jackson boulevard, Chicago., has issued an excellent new catalog of the Green power scraper. The catalog is not only well illustrated with photographs of installations but it contains some valuable line drawings which give a good idea of the many ways in which this excavating device may be used.

Gilman Manufacturing Co., East Boston, Mass., has issued its Bulletin No. 101 on the mounted rock drills made by the company. These are hammer drills and made in several sizes from the light "Bantam," which may be held in the hand or mounted on a bar, to the heavy drifter with pneumatic feed. The bulletin is well written and gives an excellent description of how the drill is made and operated.

Building Trades Employers Against the Five Day Week

BUILDING trades employers from cities throughout the United States, meeting in Cleveland, Ohio, on January 5, 1925, went on record as being opposed to the five-day week by the building trades in many localities.

In practically every instance where the short week has been asked for the demand is accompanied with a request for an increased hourly wage, so that the mechanic might be able to earn in 40 hours what he formerly did in 44 hours.

There is a serious shortage in most of the major trades at the present time and if the five-day week is universally adopted this will be still further increased by about 10 per cent.

Reports submitted at the conference of the National Association of Building Trades Employers indicate that in a number of cities some of the trades have already succeeded in putting into operation the five-day week. This is true in the case of the painters in New York and Boston, while the plasterers in Philadelphia and Boston are only working 40 hours per week.

Wage Rates Reach New High Point

A NATION-WIDE survey of wages just completed by the U. S. Department of Labor shows that the prevailing rates of pay throughout the United States for 1924 are the highest in history. The average hourly rate was 128% greater than 1913 and 154.2% greater than 1907 and 8.3% greater than 1923. In arriving at these figures the department compiled the union scale of wages of 894,340 members of organized trades in 66 cities. The report shows that there has been a steady advance in hourly wage rates since 1907 and a steady decrease in working hours.

Canadian Gypsum Shipments

TOTAL shipments of gypsum from Canadian deposits during 1923, according to the Dominion Bureau of Statistics, amounted to 578,301 tons, valued at $2,243,100, as compared with 559,265 tons, worth $2,160,898, in the previous year. By provinces the shipments were: Nova Scotia, 341,705; New Brunswick, 104,740; Ontario, 99,958; Manitoba, 31,575; British Columbia, 323.—*New York Post.*